This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

LANE MEDICAL LIBRARY STANFORD
L61 .F62 1879 STOR
Clinical medicine: a systematic treatise
24503402775

LANE

MEDICAL LIBRARY

SEAL OF THE LELAND STANFORD JUNIOR UNIVERSITY
1885

LEVI COOPER LANE FUND

PRESENTED TO

The New York Academy of Medicine.

By

The Society of the New York Hospital,

March, 1898.

CLINICAL MEDICINE.

CLINICAL MEDICINE.

WORKS BY AUSTIN FLINT, M.D.

Professor of the Principles and Practice of Medicine and of Clinical Medicine in the Bellevue Hospital Medical College, N. Y., &c.

A TREATISE ON THE PRINCIPLES AND PRACTICE OF MEDICINE; Designed for the Use of Students and Practitioners of Medicine. Fourth Edition, Revised and Enlarged. In one large and closely printed octavo volume of nearly 1100 pages. Price in cloth, $6; or strongly bound in leather, with raised bands, $7.

A MANUAL OF PERCUSSION AND AUSCULTATION; of the Physical Diagnosis of Diseases of the Lungs and Heart, and of Thoracic Aneurism. In one royal 12mo. vol. of 255 pages. Cloth, $1.75.

PHTHISIS; Its Morbid Anatomy, Symptomatic Events and Complications, Fatality and Prognosis, Treatment and Physical Diagnosis, in a Series of Clinical Studies. In one large and handsome octavo volume of 446 pages. Cloth, $3.50.

ESSAYS ON CONSERVATIVE MEDICINE AND KINDRED TOPICS. In one very handsome royal 12mo. volume of 214 pages. Cloth, $1.38.

A PRACTICAL TREATISE ON THE DIAGNOSIS, PATHOLOGY, AND TREATMENT OF DISEASES OF THE HEART. Second Revised and Enlarged Edition. In one octavo volume of 550 pages, with a Plate. Cloth, $4.

A PRACTICAL TREATISE ON THE PHYSICAL EXPLORATIONS OF THE CHEST, AND THE DIAGNOSIS OF DISEASES AFFECTING THE RESPIRATORY ORGANS. Second and Revised Edition. In one handsome octavo volume of 595 pages. Cloth, $4.50.

HENRY C. LEA, Philadelphia.

5-8241

CLINICAL MEDICINE:

A SYSTEMATIC TREATISE

ON THE

DIAGNOSIS AND TREATMENT OF DISEASES.

DESIGNED FOR THE USE OF STUDENTS AND
PRACTITIONERS OF MEDICINE.

THE
PROPERTY
OF THE
N. YORK HOSPITAL.

BY

AUSTIN FLINT, M.D.,

PROFESSOR OF THE PRINCIPLES AND PRACTICE OF MEDICINE, AND OF CLINICAL MEDICINE IN THE BELLEVUE HOSPITAL MEDICAL COLLEGE; FELLOW OF THE NEW YORK ACADEMY OF MEDICINE; HONORARY MEMBER OF THE MEDICAL SOCIETIES OF THE STATES OF VIRGINIA, RHODE ISLAND, KENTUCKY, AND MASSACHUSETTS; ASSOCIATE FELLOW OF THE COLLEGE OF PHYSICIANS OF PHILADELPHIA; HONORARY FELLOW OF THE MEDICAL SOCIETY, AND HONORARY MEMBER OF THE CLINICAL SOCIETY OF LONDON; CORRESPONDING MEMBER OF THE ACADEMY OF MEDICAL SCIENCE IN PALERMO, ETC.

LANE MEDICAL LIBRARY
12643.
SAN FRANCISCO

PHILADELPHIA:
HENRY C. LEA.
1879.

B

Entered according to Act of Congress, in the year 1879, by
HENRY C. LEA,
in the Office of the Librarian of Congress. All rights reserved.

COLLINS, PRINTER.

F62
1879

TO

THE MEMORY

OF

JAMES JACKSON, JOHN WARE, AND JACOB BIGELOW,

THE SPIRIT OF WHOSE ORAL INSTRUCTIONS

RECEIVED DURING HIS PUPILAGE,

THE AUTHOR HAS ENDEAVORED TO FOLLOW THROUGHOUT LIFE,

AS

STUDENT, TEACHER, WRITER, AND PRACTITIONER,

This Volume

IS GRATEFULLY INSCRIBED.

PREFACE.

THE belief that a work devoted to the Diagnosis and Treatment of Diseases would be of aid to the medical student in his clinical studies, and useful, as a book of reference, to the practitioner, has led to the preparation of this volume.

The plan of the work, and the arrangement of diseases, have been made with special reference to Clinical Medicine. In the Introduction are considered topics of importance as bearing on medical study and practice. Conforming to the nosological method now generally adopted, diseases are divided into General and Local, and the latter are distributed into classes corresponding with the different physiological systems, namely, the Respiratory, Circulatory, Digestive, Urinary, and Nervous. Each of the six sections is prefaced by preliminary observations relating to Symptomatology, and other topics of practical importance as bearing on the clinical study and treatment of the diseases considered in that section.

As far as practicable, diseases are arranged by grouping together those of which the diagnosis involves differentiation from each other. Regarded from a clinical standpoint, the advantage of this arrangement is more than compensatory for any apparent inconvenience in making hasty reference to particular diseases. Such reference will be found sufficiently facilitated by the conspicuous headings throughout the text, combined with an analytical table of contents and a full index.

Of the several sections, the one devoted to Diseases of the Nervous System occupies the largest space. The activity of pathological and clinical research has given to this province of medicine, within late years, greatly increased extension and importance; and it moreover seemed to the author appropriate to include in this section the consideration of mental affections.

The work is intended to accompany, and not, in any measure, to supersede, more comprehensive treatises embracing the morbid anatomy, the causation and the pathology of diseases. It is needless to say that no one who neglects these fields of study can become an intelligent or competent physician; but it has seemed to the author that a serviceable coadjutor to the larger text-books might be found in a volume which should be devoted exclusively to the two great practical objects of medical science, namely, Diagnosis and Treatment, viewed in the light of the latest observations and experience. Such a work, if properly wrought out and properly used, can hardly fail to prove of assistance to both student and practitioner in prosecuting the clinical labors which should commence with medical pupilage, and continue to the end of professional life. The author does not flatter himself that he has realized the ideal which he had in view in planning the volume; he can only say that the incentive in its preparation has been the desire to render a service to those for whom it is designed.

NEW YORK, August, 1879.

THE LIBRARY OF THE N. Y. HOSPITAL.

CONTENTS OF THE INTRODUCTION.

	PAGE
Definition and scope of clinical medicine; its practical ends and the requirements of knowledge therefor	17
Modes of examining patients	18
Clinical records	20
Clinical reports	21
Methods in diagnosis	22
Symptomatology, the chief source of the data for diagnosis	22
Symptoms relating to the general aspect of patients	23
The facies of anæmia and the cyanotic facies	23
The facies of renal disease, the malarial facies, the facies of carcinoma, the typhoid facies, the facies of acute peritonitis, acute pneumonia, hectic fever, and exophthalmic goitre	24
The choleraic and hippocratic facies	25
Symptoms relating to the pulse, the sphygmograph	25
Increased frequency of the pulse	26
Diminished frequency of the pulse	28
Quickness and slowness of the pulse	28
Hardness and softness of the pulse	29
Fulness and smallness of the pulse	30
Strength, weakness, and irregularity of the pulse	30
Symptoms relating to the temperature of the body, clinical thermometers	32
Situations in which the thermometer may be applied, rules in taking temperature, normal thermometry	33
Thermometry in disease	34
Symptoms relating to the tongue	36
Sources of error in diagnosis	40
Simulation of diseases	41
The objects, ultimate, and immediate, in treating cases of disease	42
Hygienic treatment in cases of disease	45
Medicinal treatment in cases of disease	49
Sources of error in therapeutics	53
The expectant system in treating cases of disease	55
The professional conduct of physicians	60

SECTION FIRST.

DISEASES OF THE RESPIRATORY SYSTEM.

Preliminary Observations.

Symptomatology.

Cough	61
Expectoration	63
Hæmoptysis	64
Respiration	68
Pain	70
Voice	71

Physical Signs.

PAGE
Percussion 73
Auscultation 74
Diminished and suppressed respiratory murmur 74
Increased murmur of respiration, shortened inspiratory and prolonged expiratory sound, bronchial and broncho-vesicular respiration 75
PAGE
Cavernous and amphoric respiration, adventitious sounds or râles 76
Subcrepitant, moist bronchial, crepitant, dry bronchial, cavernous and friction râles 77
Inspection, palpation, and mensuration 78
Succussion, laryngoscopy . . 79

The Diagnosis and Treatment of Diseases of the Respiratory System.

I. INFLAMMATORY DISEASES OF THE RESPIRATORY ORGANS WITHIN THE CHEST.

Acute pleurisy, pneumonia, bronchitis and capillary bronchitis . 80
Diagnostic symptoms of these diseases 81
Local symptoms of these diseases . 81
Pain 81
Cough and expectoration. Respiration and dyspnœa . . . 82
Physical signs of these diseases . 83
Inspection and percussion . . 83
Auscultation 84
Palpation, mensuration, and succussion 85
General symptoms of these diseases 85
Treatment of acute pleurisy . . 86
Treatment of acute pneumonia . 87
Treatment of acute bronchitis . 90
Treatment of capillary bronchitis . 91

Varieties of Acute Pleurisy, Pneumonia, and Bronchitis.

Circumscribed pleurisy . . . 92
Empyema 93
Pleurisy with pneumo-thorax . 94
Embolic pneumonia . . . 94
Hypostatic pneumonia . . . 95
Fibrinous bronchitis . . . 96
Broncho-pneumonia . . . 97
Epidemic bronchitis . . . 100
Pertussis, whooping-cough . . 100
Summer and autumnal bronchitis, hay fever, hay asthma . . 103

II. CHRONIC INFLAMMATORY DISEASES OF THE RESPIRATORY ORGANS WITHIN THE CHEST.

Chronic simple pleurisy, empyema, pleurisy with pneumo-thorax . 105
Diagnostic symptoms of these diseases 105
Local symptoms 106
Pain, cough, expectoration, respiration, and dyspnœa . . . 106
Physical signs in these diseases . 107
Inspection and percussion . . 107
Auscultation, palpation, and mensuration 108
Succussion, exploratory puncture of the chest 109
General symptoms in these diseases 109

Varieties of Chronic Pleurisy, Empyema, and Pleurisy with Pneumo-thorax.

PAGE
Bilateral pleurisy, hemorrhagic pleurisy, circumscribed empyema . 110
Empyema with spontaneous perforation of chest wall, circumscribed pleurisy with pneumothorax 111
Treatment of chronic simple pleurisy 111
Treatment of empyema . . 112
Treatment of pleurisy with pneumothorax 113
Pneumonic phthisis, pulmonary consumption 114
Treatment of pneumonic phthisis . 117
Chronic bronchitis, diagnostic symptoms of 119
Treatment of chronic bronchitis . 121
Fetid bronchitis 122
Acute miliary tuberculosis . . 123
Insterstitial pneumonia, fibroid phthisis, cirrhosis of lung, pulmonary sclerosis . . . 124

III. STRUCTURAL DISEASES OF THE RESPIRATORY ORGANS WITHIN THE CHEST.

Structural diseases producing obstruction of the lower portion of the trachea or of a primary bronchus 127
Pulmonary emphysema . . . 129
Varieties of emphysema . . 132
Pulmonary gangrene . . . 133
Carcinomatous and other morbid growths 135
Mediastinal tumors . . . 137
Parasitic productions . . . 138

IV. FUNCTIONAL DISEASES OF THE RESPIRATORY ORGANS WITHIN THE CHEST.

Hydrothorax 139
Pulmonary œdema . . . 140
Asthma 141
Treatment of asthma . . . 142
Bronchial hemorrhage . . . 144
Pleurodynia and dorso-intercostal neuralgia 146
Paralysis of the diaphragm . . 147
Tonic spasm of the diaphragm . 148
Clonic spasm of the diaphragm . 149

V. DISEASES OF THE LARYNX.

Simple acute and subacute laryngitis 149
Pseudo-membranous laryngitis . 152
Chronic laryngitis 154
Œdema of the glottis . . . 157
Spasm of the glottis . . . 159
Paralysis of the laryngeal muscles . 162

SECTION SECOND.

DISEASES OF THE CIRCULATORY SYSTEM.

Preliminary Observations.

Symptomatology of Cardiac Disease.

Examination of the blood . . 168
Pain 169
Disturbances of the heart's action . 169
Abnormal characters of the pulse . 170
Dyspnœa 170
Cyanosis 170
Œdema and anarsarca . . . 171

Physical Signs of Cardiac Disease.

PAGE
Palpation and percussion . . . 171
PAGE
Mensuration, inspection, and auscultation 172

Symptoms and Signs Referable to Vessels.

Pulsation and bellows murmur . 175
Venous pulse 176
Congestion 177

The Diagnosis and Treatment of Diseases of the Circulatory System.

I. DISEASES OF THE BLOOD.

Simple anæmia 178
Chlorosis 180
Pernicious anæmia . . . 180
Addison's disease 182
Lymphatic anæmia, Hodgkin's disease 184
Leucocythemia 185
General dropsy 188
Pyæmia and septicæmia . . 192
Scorbutus 194
Purpura hæmorrhagica . . 196
Hæmatophilia 197

II. INFLAMMATORY DISEASES OF THE HEART.

Acute pericarditis 199
Subacute and chronic pericarditis . 204
Endocarditis 207
Ulcerative endocarditis . . . 210

III. STRUCTURAL DISEASES OF THE HEART.

Valvular lesions 212
Cardiac thrombosis or heart clot . 217
Lesions of the walls of the heart . 219
Hypertrophy and dilatation of the heart 219
Fatty degeneration of the heart . 223
Cyanosis, from congenital malformations of the heart . . . 226
Angina pectoris 226

IV. FUNCTIONAL DISORDER OF THE HEART.

Increased frequency of the heart's action 230
Diminished frequency of the heart's action 231
Intermittency of the heart's action 231
Inequality of the heart's action . 232
Reduplication of the heart-sounds 232
Treatment of functional disorder of the heart 233
Functional disorder of the heart associated with structural disease . 234
Exophthalmic goitre, Graves' disease, Basedow's disease . . 234

V. DISEASES OF THE VESSELS.

Aortitis 237
Thoracic aneurism . . . 238
Abdominal aneurism . . . 242
Treatment of thoracic and abdominal aneurism 243
Thrombosis and embolism . . 246
Thrombosis of veins . . . 246
Thrombosis and embolism of arteries 247
Embolism of pulmonary artery . 247
Embolism of arterial trunks of the systemic circulation . . . 248

SECTION THIRD.

DISEASES OF THE DIGESTIVE SYSTEM.

Preliminary Observations.

PAGE
Vomiting 249
Vomiting, serous or watery, vomiting of mucus and pus . . 251
Vomiting of blood, Hæmatemesis . 252
Treatment of hæmatemesis . . 253
Bilious and fecal vomiting, vomiting of entozoa 254
Intestinal dejections . . . 255
Lienteric, serous or watery, and mucous dejections . . . 255
Purulent and bloody dejections . 257
Dejections containing portions of the intestinal tube 258
PAGE
Pseudo membranous and fatty dejections 258
Gall-stones in the dejections . . 259
Entozoa and foreign bodies in the dejections 260
Absence, deficiency, and excess of bile in the dejections . . . 261
Pain in diseases of the digestive system 262
Examination of the abdomen . 263
Abdominal tumors . . . 265
Rectal alimentation . . . 266

The Diagnosis and Treatment of Diseases of the Digestive System.

I. DISEASES OF THE PHARYNX.

Acute pharyngitis 268
Subacute pharyngitis . . . 269
Chronic pharyngitis . . . 269
Tonsillitis 271

II. DISEASES OF THE ŒSOPHAGUS.

Œsophagitis, perforation and obstruction of the œsophagus . 272
Spasm or œsophagismus . 273, 613

III. DISEASES OF THE GLANDS OF THE NECK.

Parotiditis 274
Goitre 275
Enlargement of the lymphatic glands, scrofula 275

IV. INFLAMMATORY DISEASES OF THE STOMACH AND INTESTINES.

Acute gastritis 278
Acute toxical gastritis . . . 280
Acute enteritis 280
Acute dysentery 281
Acute cæcitis or typhlitis . . 282
Treatment of acute gastritis . . 282
Treatment of toxical gastritis . 283
Treatment of acute enteritis . . 283
Treatment of acute dysentery . 284
Treatment of acute typhlitis . . 286
Phlegmonous inflammation of the stomach and intestines . . 286
Subacute gastritis 287
Chronic gastritis 288
Subacute enteritis . . . 289
Chronic enteritis 289
Subacute dysentery . . . 290
Chronic dysentery . . . 290
Subacute and chronic typhlitis . 294
Inflammation of the vermiform appendix of the cæcum . . 295
Acute peritonitis 296
Chronic perionitis . . . 299
Circumscribed, local, or partial peritonitis 300
Hydroperitoneum 301

PAGE
Gastric and intestinal ulceration, Perityphlitic abscess . . . 304
Ulceration of the stomach . . 305
Ulceration of the duodenum . . 307
Ulceration of the ileum . . 308
Ulceration of the cæcum . . 309
PAGE
Perityphlitic abscess . . . 309
Ulceration of the colon and rectum 312
Cancer of the stomach . . . 312
Cancer of the intestines . . 315
Cancer of the peritoneum . . 316

V. Diseases Causing Gastric and Intestinal Obstruction.

Gastric obstruction, dilatation of the stomach 317
Intestinal obstruction, with strangulation 320
Diagnosis of intussusception . . 322
Treatment of intussusception . 323
Obstruction without strangulation . 325
Fecal tumors 328
Diseases of the gastric and intestinal glands 329

VI. Functional Diseases of the Stomach and Intestines.

Gastralgia 331
Enteralgia, gastro-enteralgia . . 334
Enteralgia from lead, lead colic . 335
To detect lead in the urine . . 336
Intestinal colic 338
Acute disorders of digestion . . 339
Chronic disorders of digestion . 340
Chronic dyspepsia 340
Chronic indigestion 342
Regurgitations and vomiting . . 342
Cardialgia and tympanites . . 343
Anorexia 346
Vomiting 347
Diarrhœa 349
Habitual constipation . . . 351
Obstipation 354
Functional obstruction of the bowels 354
Sporadic cholera 355
Infantile cholera 356
Intestinal parasites, helminthiasis . 358
Ascaris lumbricoides, or round-worm 358
Oxyuris vermicularis, or thread-worm 359
Tæniæ, or tape-worms . . . 360
Anchylostomum duodenale . . 363
Tricocephalus dispar . . . 365
Trichina spiralis 365

VII. Diseases of the Liver.

Acute, diffuse, or parenchymatous hepatitis, acute yellow atrophy . 370
Suppurative hepatitis and abscess of the liver 372
Chronic interstitial hepatitis, cirrhosis of the liver . . . 375
Syphilitic hepatitis . . . 377

Structural Diseases of the Liver.

Fatty liver 378
Waxy, lardaceous, or amyloid liver 379
Cancer of the liver . . . 380
Hydatid tumor of the liver . . 381

Functional Diseases of the Liver.

Congestion of the liver . . . 384
Disorders of the secretory, and the excretory, function of the liver . 385
Hepatalgia 385

Diseases of the Biliary Passages.

Obstruction of the bile ducts, jaundice 386
The passage of gall-stones . . 389
Diseases of the gall-bladder . . 393

VIII. DISEASES OF THE SPLEEN.

PAGE
Splenitis and abscess of the spleen 397
Waxy degeneration of the spleen . 397
Carcinoma of the spleen . . 397
Hydatids in the spleen . . . 398

IX. DISEASES OF THE PANCREAS. . . . 398

SECTION FOURTH.

DISEASES OF THE URINARY SYSTEM.

Preliminary Observations.

Symptoms relating to the Urine.

Quality, specific gravity, reaction, and general appearance of the urine 402
Amount of urea 404
Albumen in the urine, albuminuria 405
Blood in the urine, hæmaturia, hæmatinuria 407
Pus in the urine 408
Casts and epithelium in the urine . 409
Uræmia 410
Treatment of uræmia . . . 414

The Diagnosis and Treatment of Diseases of the Kidneys.

Acute parenchymatous nephritis, acute tubal nephritis, acute Bright's disease, acute albuminuria 418
Chronic parenchymatous nephritis . 422
Chronic interstitial nephritis . . 424
Waxy disease of the kidneys . 426
Suppurative nephritis, and perinephritic abscess 428
Pyelitis, pyelonephritis, pyonephrosis, hydronephrosis . . . 430
Renal cysts with enlargement of the kidneys 434
Renal cancer 435
Hydatid disease of the kidneys . 436
Tuberculous disease of the kidneys, nephro-phthisis . . . 437
New formations in the kidney . 438
Renal colic, nephrolithiasis . . 438
Hæmaturia, hæmatinuria or hæmoglobinuria 443
Congestion of the kidneys . . 444
Movable or floating kidneys . . 446
Diabetes mellitus 447
Diabetes insipidus . . . 455

SECTION FIFTH.

DISEASES OF THE NERVOUS SYSTEM.

Preliminary Observations.

Symptoms relating to General Sensibility.

Pain 459
Hyperæsthesia 461
Cutaneous anæsthesia, analgesia . 462
Muscular anæsthesia . . . 466

Symptoms relating to the Special Senses.

PAGE
Vision and the eye 467
Audition 472
Olfaction 472
Gustation 473

Symptoms relating to the Mental Faculties.

Coma 474
Somnolency 475
Delirium 475
Feebleness of mind . . . 476
Aphasia 476

Symptoms relating to Muscular Movements.

Motor paralysis, akinesis . . 479
Treatment of motor paralysis . 482
Ataxia 482
Convulsions and spasms . . 483
Cramp 485
Contracture 485
Tremor 486
Reflex movements . . . 487

The Diagnosis and Treatment of Diseases of the Nervous System.

I. INTRA-CRANIAL AND INTRA-SPINAL ACUTE INFLAMMATORY DISEASES.

Acute simple cerebral meningitis . 488
Tuberculous meningitis . . 492
Acute spinal meningitis, and acute myelitis 496

II. DISEASES GIVING RISE TO SUDDEN OR APOPLECTIC COMA.

Cerebral hyperæmia . . . 498
Cerebral hemorrhage . . . 498
Meningeal hemorrhage . . . 500
Hæmatoma of the dura mater . 501
Thrombosis and embolism . . 501
Cerebral exhaustion . . . 503
Uræmia 504
Insolation 504
Treatment of the diseases giving rise to sudden coma . . . 505

III. DISEASES GIVING RISE TO COMA MORE OR LESS SLOWLY.

Hyperæmia 508
Chronic cerebral meningitis . . 510
Epileptic coma 513
Hysterical coma 513
Cataleptic coma 514
Alcoholic coma 514
Narcotic coma 516

IV. PARALYTIC DISEASES.

General cerebral paralysis . . 524
Cerebral hemiplegia . . . 526
Hemiplegia from cerebral hemorrhage 527
Hemiplegia from thrombosis and embolism 530
Hemiplegia from, and the diagnosis of, intracranial tumors . . 531
Hemiplegia from, and the diagnosis of, cerebral abscess . . . 537
Functional hemiplegia . . . 540

V. PARALYSIS AFFECTING CRANIAL NERVES.

Facial paralysis 543
Glosso-labial, or bulbar paralysis . 546

VI. SPINAL PARALYSIS.

PAGE
General spinal paralysis . . 549
Unilateral spinal paralysis, spinal hemiplegia, and hemiparaplegia 553
PAGE
Paraplegia 554

VII. SPINAL PARALYSIS FROM INFLAMMATION OF THE MOTOR TRACT.

Acute infantile paralysis . . 562
Inflammation of the motor tract in the adult 564
Locomotor ataxia . . . 566

VIII. CEREBRO-SPINAL PARALYSIS.

Cerebro-spinal sclerosis . . 572
Paralysis agitans 576

IX. MYOPATHIC PARALYSIS.

Progressive muscular atrophy . 577
Pseudo-hypertrophic paralysis . 580
Local paralyses affecting spinal nerves 583
Paralysis from lead and other metals 585

X. SPASMODIC OR CONVULSIVE DISEASES.

Tetanus and tetanoid spasms . . 587
Treatment of cases of poisoning by strychnia 592
Epilepsy 593
Epileptoid affections . . . 596
Treatment of epilepsy . . . 597
Hysterical convulsions . . . 601
Catalepsy 603
Chorea 604
Rabies 607

X. LOCAL SPASMODIC DISEASES.

Spasm of the muscles of the face . 613
Spasm of the muscles of the neck . 615
Spasm of the muscles of the upper extremities 615
Spasm of the muscles of the lower extremities 616

XI. NEURALGIC DISEASES.

Cephalalgia, hemicrania . . 620
Neuralgia of the fifth nerve . . 623
Cervico-occipital neuralgia, cervico-brachial neuralgia . . . 624
Lumbo-abdominal, lumbo-femoral neuralgia, sciatica . . . 625
Neuralgia of the genital organs and coccyalgia 626
Treatment of neuralgic diseases . 626
Myalgia 629

XII. FUNCTIONAL DISEASES (NEUROSES) NOT INCLUDED IN THE FOREGOING GROUPS.

Hysteria 631
Delirium ebriosum 635
Delirium tremens 635
Dipsomania 639
Vertigo 642
Melancholy and hypochondrism . 645
Nervous exhaustion . . . 648
Sleeplessness 650
Spinal irritation 651

XIII. MENTAL DISEASES, OR INSANITY.

PAGE
Mania 654
Monomania 656
Melancholia 658
Emotional and impulsive insanity . 659
PAGE
Dementia 664
Idiocy, imbecility . . . 665
Treatment of mental diseases . 666

SECTION SIXTH.

FEVERS AND OTHER GENERAL DISEASES.

Preliminary Observations.

Temperature in fever . . . 671
Nosological distribution of fevers . 672
Antipyretic measures of treatment 674

The Diagnosis and Treatment of Fevers.

I. THE CONTINUED FEVERS.

Simple continued fever, febricula, ephemeral fever . . . 677
Typhoid Fever 678
Typhus fever 695
Relapsing fever 697
Cerebro-spinal fever 700
Diphtheritic fever, diphtheria . 705
Erysipelatous fever 713
Pharyngeal fever 715

II. THE PERIODICAL FEVERS.

Intermittent fever . . . 716
Masked intermittent fever . . 718
Latent intermittent fever . . 719
Treatment of simple intermittent fever 720
Remittent fever 722
Pernicious malarial fever . . 723
Typho-malarial fever 728
Yellow fever 731
Dengue 736

III. THE ERUPTIVE FEVERS.

Smallpox, Measles, and Scarlet Fever.

Diagnostic characters of . . 738
Anomalies or irregular forms, complications and sequels of smallpox 744
Complications and sequels of measles 745
Complications and sequels of scarlet fever 747
Varicella 748
Vaccinia 750
Rötheln, or German measles . . 752
Prevention and treatment of smallpox 754
Prevention and treatment of measles 756
Prevention and treatment of scarlet fever 757, 759

IV. Rheumatism and Gout.

PAGE
Acute and subacute rheumatism . 763
Complications of acute and subacute rheumatism 765
Treatment of acute and subacute rheumatism 776
Chronic rheumatism . . . 769

PAGE
Acute and subacute gout . . 771
Chronic gout 772
Treatment of gout . . . 773
Prevention of gout . . . 774
Rheumatic gout, rheumatoid arthritis, deforming arthritis . . 776

V. Epidemic Cholera. 778

ERRATA.

Page 23, third line of second paragraph, *for* “decubitis,” read “decubitus.”

Page 88, eighth line of third paragraph, *for* “appears,” read “appear.”

Page 197, first line of fifth paragraph, *for* “efforts to avert it,” read “efforts to avert them.”

Page 210, sixth line of second paragraph, *for* “carbonate,” read “bicarbonate.”

Page 328, seventeenth line of third paragraph, *for* “Carson H. Hawkins,” read “Cæsar H. Hawkins.”

Page 337, twentieth line of fourth paragraph, *for* “it can have no effect,” read “they can have no effect.”

Page 373, twenty-fourth line of second paragraph, *for* “13°,” read “103°.”

Page 425, third line of sixth paragraph, *for* “uræmia,” read “anæmia.”

Page 449, second line of third paragraph, *for* “and filtered before,” read “and the urine filtered before.”

Page 464, in foot-note, *for* “Grosset,” read “Grasset.”

Page 467, fifth line of fourth paragraph, *for* “marked appearances of the fundus oculi,” read “morbid appearances.”

Page 515, seventh line of second paragraph, *for* “afflictions,” read “affections.”

Page 529, third line of third paragraph, *for* “on the brain substance,” read “in the brain substance.”

Page 547, sixth line of third paragraph, *for* “amyatrophic,” read “amyotrophic.”

Page 551, third line of second paragraph, *for* “amyothropic,” read “amyotrophic.”

Page 579, third line, *for* “*le main*,” read “*la main*.”

Page 684, second line of seventh paragraph, *for* “typhod,” read “typhoid.”

Page 774, twenty-fifth line, and page 775, fourth line of third paragraph, *for* “Apolinaris,” read “Apollinaris.”

CLINICAL MEDICINE.

INTRODUCTION.

Definition and scope of Clinical Medicine—Its practical ends Diagnosis and Treatment—Prophylaxis—Aims and plan of this work—Modes of examining patients—Clinical records—Clinical reports—Methods in diagnosis—Symptomatology the chief source of the data for diagnosis—Symptoms relating to the general aspect of patients: the facies of anæmia, cyanosis, renal disease, malarial disease, carcinoma, the typhoid state, acute peritonitis, pneumonia and hectic fever, exophthalmic goitre, cholera, and the Hippocratic facies—Symptoms relating to the pulse: increased frequency, diminished frequency, quickness and slowness, hardness and softness, fulness and smallness, strength and weakness, and irregularity—Symptoms relating to the temperature of the body: clinical thermometers, rules in taking temperature, normal thermometry, thermometry in disease—Symptoms relating to the tongue—Sources of error in diagnosis—Simulation of diseases—The objects, ultimate and immediate, in treating cases of disease—Hygienic treatment in cases of disease—Medicinal treatment in cases of disease—Sources of error in therapeutics—The expectant system in treating cases of disease—The professional conduct of physicians.

CLINICAL MEDICINE, strictly defined, means the study of diseases at the bedside. The term clinical, however, is used to distinguish a branch of medicine embracing the study of all diseases, inclusive of those which do not require confinement to the bed. As distinguished from special pathology, which is the study of diseases, clinical medicine is the study of cases of disease. The subjects of study in this branch of medicine are patients affected with disease. It comprehends everything which has a bearing on the investigation and management of the cases of disease occurring in medical practice.

The study of clinical medicine has reference to two ends, namely, diagnosis and treatment. In the investigation of any case of disease, the first end is the diagnosis; that is, to ascertain with what disease, or it may be diseases, the patient is affected. Having made the diagnosis, the second end is the treatment, which embraces measures for arresting diseases, diminishing their severity, shortening their duration, promoting a favorable termination, preventing complications, effects, or sequels, and the relief of suffering. The means of investigation for these ends require knowledge pertaining to each and all of the subdivisions of general and special pathology. Knowledge of physics and chemistry also enters into methods of investigation. Moreover, psychology and an acquaintance with the diversities of human character are not infrequently involved. The range of clinical medicine thus is not restricted exclusively within the limits of purely medical science.

2

Prophylaxis, the prevention of diseases, or preventive medicine, as it has recently been called, does not, strictly speaking, belong to either of the foregoing branches. It is, however, based chiefly upon what is known respecting the causation of disease or etiology. In proportion as our knowledge of morbific agencies advances, more especially of those characterized as special or specific, it may be expected that the means of preventing diseases by repelling or destroying their causes will be increased. Prophylaxis is, therefore, with propriety considered as a collateral branch of medical science. As such it is properly enough treated of in connection with either general or special pathology, and it may also be connected incidentally with the study of clinical medicine.

In writing a work on clinical medicine the aim of the author is to furnish to the medical student and practitioner a guide in the investigation of cases of disease with reference to the diagnosis and the treatment. The plan of the work will be as follows: the remainder of this introduction will be devoted to some general considerations; the work will then be divided into sections corresponding to the divisions into which diseases are distributed in accordance with the nosological arrangement generally adopted in this country, prefacing each section with some account of the symptomatology and the methods of examination relating to the diseases considered in that section.

Modes of Examining Patients.

The exigencies of medical practice often require a speedy diagnosis with reference to immediate therapeutical indications. The mode of examination is, then, to seek at once, under the guidance of symptoms, for the seat and character of the disease. Pain, distress, or morbid sensations of some kind, in other words, subjective symptoms, generally give a correct direction to the examination. Certain manifest objective symptoms, such as lividity of the face, rapid or labored breathing, vomiting, cough, etc., may direct attention to the seat of the disease; but naturally the first question asked is, From what do you suffer or what are your ailments? The diagnosis is based on the interpretation of the subjective symptoms educed by these and other questions, together with the information obtained by interrogating as far as practicable the organ or organs prominently affected. In judging of therapeutical indications, certain general symptoms are to be taken into account, more especially those referable to the circulation and the temperature of the body.

This mode of examining is allowable on the ground of the necessity of haste. As soon as practicable the examination should be made complete by extending it over the whole body and obtaining all important details belonging to the previous history of the case. Owing to neglect in this regard, not infrequently grave affections are overlooked. As illustrations of this statement, certain gastric symptoms may be considered as merely evidence of functional disorder of the stomach when they are dependent on carcinoma of this organ, or on disease of the kidneys; and a patient may be supposed to be affected with only dyspepsia, latent intermittent fever, or general debility, who has chronic pleurisy with large effusion.

In some cases a prompt diagnosis is desirable when the condition of the patient precludes any aid from subjective symptoms. A patient in the state of coma, may be seen by a physician for the first time, and he may be unable to obtain any account of the previous health or the circumstances preceding this state. Now coma may proceed from either active hyperæmia of the brain, extravasation of blood within the skull, embolism, uræmia, alcoholism, an epileptic paroxysm, narcotism, hysteria, insolation, nervous exhaustion, or an injury of the head. It may be highly important to determine, without delay, if possible, which one of these several conditions exists. The diagnosis must of course be based exclusively on objective symptoms.

The prognosis and the treatment hinge upon the diagnosis, which is likely to be correct in proportion to the knowledge and skill of the physician. Other things being equal, the risk of making an imperfect or an erroneous diagnosis, is proportionate to the rapidity and incompleteness of the examination; but, under certain circumstances, the treatment must be based upon a provisional diagnosis. Indeed, in some cases the urgency of therapeutical indications calls for active measures of treatment before it is possible to reach a definite diagnosis.

A full investigation of a case includes everything past or present which may have a bearing on the diagnosis and treatment. There is much advantage in adopting a systematic order in the examination. A simple classification, easily carried in the memory, facilitates the examination, and affords security against important omissions. A uniform classification is quite essential in making complete records of cases. The plan which the author has pursued for many years is as follows:—

After the name, age, and occupation, the antecedents are noted; that is, past diseases, general state of health, habits of life, and facts relating to family predisposition. Next, the previous history, embracing, with the duration of the illness, the important events which have occurred, in the order of their occurrence, and any supposed cause or causes.

The general aspect of the patient, and whatever may be apparent on inspection in regard to muscular debility, nutrition, physiognomy, decubitus, etc., are next noted. Then follows an account of present symptoms and signs referable to the several physiological systems, namely, the digestive, the circulatory, the respiratory, the genito-urinary, and the nervous system. Any observations not coming under either of these subdivisions are to be added. The order in which the symptomatic phenomena belonging to the different systems, severally, are noted, is not of importance; but it is well to take up first the physiological system to which the symptoms point as the seat of disease, or of its most prominent manifestations.

This order in the examination is useful whether cases be recorded or not. The object is to interrogate all parts of the body sufficiently to ascertain whatever important symptomatic phenomena may be present, and also to exclude those which are not present. Without these positive and negative facts, a case has not been fully investigated; and the diagnosis will be likely to be defective or erroneous, if, in the examination, any one of the different physiological systems be overlooked or insufficiently interrogated.

The examination of patients either in private or hospital practice, should not be made in the presence of disinterested spectators. A full investigation involves points of inquiry which are among the confidential communications from the patient to the physician. Persons who may be present without the expressed desire of the patient, should be requested to withdraw, if they do not do so from their own sense of propriety. It is proper for the physician in this way to relieve patients of the embarrassment which they might feel in making the request.

By taking this stand, physicians may perhaps eventually establish in popular apprehension the principle that patients so disposed have a right to privacy and secrecy with respect to their maladies, and that it is indecorous either to obtrude during professional visits, or to make inquiries of the physician respecting the diseases with which his patients are affected. The physician has no right to make known the diseases of his patients without their consent.

Clinical Records.

The medical student cannot too early begin to take notes of the cases brought under his observation. These early records may have little value for subsequent reference, but they involve an exercise of great use in acquiring the art of observing and in becoming familiar with clinical facts. The physician at the threshold of professional life cannot be urged too strongly to begin at once to make daily records of important cases. After much delay, the chances are that this valuable means of study and progress will be altogether neglected. Daily records should be continued during the whole of professional life. It may be that the duties of practice will after a time interfere with the leisure requisite for full notes. It is desirable that they be as full as practicable ; but if incomplete they are by no means useless. Daily records are to be recommended not less in private than in hospital practice.

The practice of recording cases has manifold advantages, some of which may be here briefly noticed.

It improves the powers of observation and leads to the discovery of personal deficiencies in this regard which may be overcome. The ability to observe correctly is not a natural gift, nor does it accompany, as a matter of course, the acquisition of knowledge from reading or didactic lectures. It is an art to be acquired.

It qualifies for describing with perspicacity the symptomatic phenomena in cases of disease. The ability to use language with accuracy and precision in simple description is not an innate faculty, but an acquirement.

It secures a more thorough study of cases, in consequence of more concentrated and prolonged attention than the cases would be likely to receive were they not recorded, and in this way it has a favorable influence on the diagnosis and treatment.

By inducing reflection and leading the practitioner to consult standard works with reference to points of inquiry which arise, it conduces in no small measure to professional improvement.

Continued for a series of years, it furnishes an accumulation of clinical experience which may be reviewed or referred to with great profit.

The analytical study of cases which have been recorded may lead to results which contribute to an enlargement of the boundaries of medical knowledge.

In keeping records, some plan must, of course, be fixed upon. Printed tables or case books in which blank spaces, under different headings, are left to be filled up, are open to the objection that the spaces may be either too large or too small. The plan which the author has pursued is a very simple one, and, perhaps on that account is to be preferred.

Volumes of records should be of a medium ledger size, with a wide margin on each page for notes or references. Commencing at nearly the middle of a page in order to have abundant room for the heading to be inserted after the case is ended, the history is carried onward to successive blank pages, noting at the bottom of each page, the one on which the history is continued, and at the top of the latter the page from which the record has been brought forward. After the volume is filled, the cases should be indexed after the names of the diseases. They may also be indexed after the names of the patients. If cases prove fatal, the results of autopsical examinations should be embraced in the histories.

The author can bear testimony from an experience of forty years to the great value of clinical records for reference in cases which come under observation a second time or repeatedly, perhaps after long intervals, and also for reference in certain cases to the progenitors or members of the same family.

In recording cases, the importance of noting negative, as well as positive facts, is to be borne in mind. The value of notes for reference or analytical study is often much impaired by omissions in this respect. It needs only a few words to note the absence of important symptoms referable to the respiratory, the circulatory, or other of the physiological systems. Without these statements, the histories are open to the criticism that certain symptoms may have existed which were either overlooked, or from inadvertency not noted.

Clinical Reports.

To be able to report cases satisfactorily, either orally or in writing, is a rare accomplishment, for the reason in part that it is not cultivated as such. A satisfactory report of a case should embrace all the important points presented concisely and lucidly without needless details. Defects in this regard are often enough apparent in medical consultations. They are manifest in medical societies in which cases are related, where it is necessary to bring out omitted points by numerous questions, or, on the other hand, when the patience of listeners is sorely tried by an unnecessary prolixity, and the introduction of irrelevant incidents. A considerable proportion of reports published in medical journals are unsatisfactory in consequence of obvious deficiencies.

Exercises in oral and written reports should enter into clinical instruction. The author, after considerable experience, can testify to the value of such exercises.

The custom of giving an account of cases at casual interviews with medical brethren, or on social occasions, is not to be encouraged. The attention of those addressed under these circumstances cannot be claimed, and a deliberate judgment is not to be expected. It is hardly necessary to add that the recital of cases to unprofessional auditors is unbecoming, and contrary to the spirit of medical ethics.

Methods in Diagnosis.

There are three methods in diagnosis, namely, the direct, the indirect, and the differential method. These three methods are frequently employed in combination.

The diagnosis is direct when it is based on pathognomonic phenomena, or on an amount of diagnostic evidence sufficient to warrant at once a positive conclusion. A symptom or sign is pathognomonic when it very rarely, if ever, occurs if a certain disease be not present. The rusty expectoration which is characteristic of pneumonia, is a pathognomonic symptom, and the crepitant râle is a pathognomonic physical sign.

The diagnostic evidence which different symptoms and signs afford, is great in proportion as the number of diseases in which they occur is small. Hæmoptysis, for example, is highly diagnostic of phthisis, because it occurs so infrequently in other affections. It is not, however, pathognomonic, for it does occur in several pathological connections.

An indirect diagnosis is made by what is commonly known as the method of exclusion. Diseases liable to be confounded with the one actually existing, are excluded by the absence of symptoms or signs which should be present if they existed. By this method the diagnostic problem may often be reduced to the inquiry which one of a few diseases exists, and sometimes reasoning from negative facts the conclusion is almost as positive as if it were based on direct evidence.

A diagnosis is made by the differential method when the problem is to decide between a few diseases, and a decision is to be reached by canvassing fairly the evidence for and against each.

Of the three methods, the direct has priority in rank, and is to be first employed in diagnosticating diseases. The indirect method is second in importance, and is to be made available whenever the direct method is not adequate for a positive diagnosis. The differential method is to be resorted to when a conclusion is not warranted by the two other methods.

Symptomatology the Chief Source of the Data for Diagnosis.

The data for diagnosis being chiefly derived from symptomatology, it follows that a practical knowledge of symptoms is essential to success as a diagnostician. This knowledge involves the ability to recognize symptoms, and to appreciate correctly the diagnostic value which they possess separately and in combination. It presupposes, not only the study of books and didactic lectures, but a certain amount of clinical observation and experience.

The symptoms referable to the different physiological systems, together with the methods of examination, will constitute in great part the preliminary observations prefacing the several sections into which this work is divided. There are, however, certain symptoms which enter more or less into the diagnosis and treatment of both general diseases and those affecting all of the different systems. The symptoms alluded to relate to the general aspect of patients, the pulse, the temperature of the body, and the appearances of the tongue. These may be appropriately considered in this introduction.

Symptoms relating to the General Aspect of Patients.

The symptoms here regarded as relating to the general aspect are those which pertain to the countenance or face. Symptoms pertaining to the decubitis or position, movements of the body or of its members, etc., in so far as they enter into the diagnosis of particular diseases, will be noticed in connection therewith. There are certain symptoms, pertaining to the face, which it will suffice to notice in the same connection; as examples—the yellowness characteristic of jaundice, the bronze coloration in the so-called Addison's disease, strabismus and variations of the pupil in nervous affections, dilatation of the nostrils in diseases affecting respiration, the modifications of the expression in certain forms of paralysis, etc. There are also certain appearances common to various affections which need only be mentioned, such as expressions of the countenance denoting pain, distress from dyspnœa, anxiety, mental depression, and a haggard aspect.

Aside from all these, certain traits of the countenance, either singly or combined, have diagnostic significance. They constitute, severally, physiognomical expressions of particular morbid conditions belonging to different diseases. In other words, a characteristic *facies* enters into the diagnosis of some diseases. The following are the more notable of the different facies:—

The Facies of Anœmia.—Paleness of the face, and especially of the prolabia, is indicative of a paucity of red globules in the blood, or anæmia. This pathological condition is incident to a great variety of diseases. If the face do not show emaciation, and the patient have not an acute disease, the paleness is evidence that the anæmic condition is the result of hemorrhage, defective alimentation, or some other cause not involving any grave co-existing affection. A greenish hue, in connection with pallor, is the etymological sense of the term Chlorosis.

The Cyanotic Facies.—Lividity or blueness of the face, more especially of the prolabia, is the characteristic feature of the congenital affection which has been called *morbus cœruleus*—an affection involving malformations of the heart, usually connected with obstruction at the orifice of the pulmonary artery. The lividity is due chiefly to congestion of the venous radicles, caused by an obstacle to the circulation in the right cardiac cavities. The presence in the systemic arteries of blood imperfectly oxygenated doubtless contributes to the lividity.

The cyanotic aspect in diseases of the heart represents, either lesions at the tricuspid orifice, or, much more frequently, dilatation of the right ventricle and auricle resulting from mitral lesions. Persistent obstruction in the course of the pulmonary circulation, as in cases of emphysema, may lead to dilatation of the right side of the heart and consequent cyanosis. Lividity of the face, in conjunction with œdema and dyspnœa, is highly diagnostic of cardiac disease.

The lividity which is often marked in different pulmonary affections, namely, pleurisy with large effusion, or empyema, hydrothorax, pneumonia, acute tuberculosis, and bronchitis affecting the small bronchial tubes, denotes, together with deficient oxygenation of the blood, an over-accumulation in the right ventricle irrespective of any cardiac lesions, and it may foreshadow death from paralysis of the heart, due to distension.

The lividity in cases of epidemic cholera is attributable, in a great measure, to stagnation in the venous radicles of the circulation, in consequence of the blood-changes in this disease; hence the significance of the term cyanotic cholera.

A tumor pressing upon the descending vena cava may cause an intensely cyanotic facies. It occurs in paroxysms of laryngeal spasm. It is sometimes marked in the cold stage of a paroxysm of intermittent fever.

The Facies of Renal Disease.—In some cases of acute albuminuria, and of chronic parenchymatous nephritis—the large white kidney of Bright—puffiness of the face from œdema, with notable pallor, renders the aspect highly diagnostic.

The Malarial Facies.—Pallor of the face, sallowness, and slight puffiness, if renal disease be excluded, point to malarial disease.

The Facies of Carcinoma.—Notable anæmia, a waxy or straw-colored complexion, and more or less emaciation, in combination, render the aspect marked in some cases of malignant disease. In a patient over forty years of age, this aspect has considerable diagnostic import, although it is by no means always present when malignant disease exists.

The Typhoid Facies.—In the middle and later periods of typhoid fever the countenance is often dull, besotted, expressionless. This facies may be present in the typhoid state which is incident to diseases other than typhoid fever, *e. g.*, pneumonia. Co-existing with a dusky hue of the skin and congestive redness of the conjunctiva, it distinguishes typhus, as contrasted with typhoid, fever.

The Facies of Acute Peritonitis.—The upper lip raised so as to expose the front teeth, gives an aspect which characterizes, in a certain proportion of cases, acute peritonitis. It is often wanting, but, when present, it is strongly diagnostic.

The Facies of Acute Pneumonia and Hectic Fever.—Circumscribed redness of one or both of the cheeks, with abruptly defined borders, is diagnostic of acute pneumonia. If it be observed in a case of chronic pulmonary disease, it denotes the so-called hectic fever, and is a sign of phthisis.

The Facies of Exophthalmic Goitre.—Projection of the eyeballs, giving to the face a remarkably staring and sometimes ferocious expression, conjoined with enlargement of the thyroid bodies and frequency of the pulse, is distinctive of the affection known as exophthalmic goitre, Graves's disease, and Basedow's disease.

The Choleraic Facies.—In the collapsed stage of cholera, the face is contracted, sometimes wrinkled; the cheeks are hollow, the eyes sunken, the skin is livid, and the expression denotes indifference. This combination of traits is quite distinctive. They are, however, to a certain extent, combined in the state of collapse which occurs in some cases of pernicious intermittent fever, and in other pathological connections.

The Hippocratic Facies.—This facies denotes the moribund state. The skin is pale, with a leaden or livid hue; the eyes are sunken, the eyelids separated, and the cornea loses its transparency; the nose is pinched, and the ears are contracted; the temples are hollow, and the lower jaw drops. Hippocrates described this facies in graphic terms, and the name Hippocratic has ever since been used to designate it.

Symptoms relating to the Pulse.

At the present time there are two methods of determining the characters which pertain to the pulsation of the arteries. One method is by the sense of touch, the fingers being applied over an artery, usually the radial at the wrist. The other method is by an instrument which delineates the characters to the eye. This instrument is called the sphygmograph.

The construction of an instrument to produce graphic traces of the pulse originated with Vierordt in 1854. A few years later Marey devised an instrument on the same principle, but greatly improved, and by means of its application made elaborate researches which added much to our knowledge of the circulation in health and disease. Marey's instrument has been simplified and made more available by further improvements.

Inasmuch as the sphygmograph is described in all late works on physiology, it would be superfluous to introduce a description of it here. The reader is supposed to be familiar with the several components of the "form of the pulse," namely, the line of ascent, corresponding to the ventricular systole, the summit of this line, which represents the condition of the arterial system at the end of the systole, and the line of descent, which corresponds to the flow of blood from the arteries to the veins during the diastole of the heart. It is with reference to the latter, more especially, that the sphygmograph affords important information not so well obtained by the tactile characters of the pulse.

In ordinary medical practice the sphygmograph has not as yet, and probably never will, come into general use. Practically, in clinical medicine, its use is in a great measure limited to diseases of the heart and arteries. It will suffice, therefore, to notice in connection with the characters of the pulse which are obtained by the touch, the correlative points in the graphic delineations.

The most important factors in determining the characters of the pulse are the action of the left ventricle of the heart and the facility with which the blood passes from the arterial to the venous system, in other words, the blood-pressure or arterial tension. Other circumstances, however, affect the pulse materially, namely, the quantity of blood, the flexibility or rigidity of the arterial coats, and the quantity of soft tissues around the vessel. It is very obvious that diseases of the heart give rise especially to abnormal modifications of the pulse. These will be noticed in connection with the diagnosis of the different cardiac diseases. In the interpretation of the symptoms relating to the pulse in other than cardiac diseases, it is important that the latter be excluded. It must, therefore, be understood that abnormal modifications of the pulse, now to be noticed, are those which are irrespective of diseases of the heart.

The abnormal characters of the pulse may be arranged as follows: increased frequency, diminished frequency, quickness and slowness, hardness and softness, fullness and smallness, strength and weakness, irregularity.

Increased Frequency of the Pulse.—The normal frequency of the pulse varies according to age, sex, and individual peculiarities. These normal variations are to be taken into account in determining abnormal characters. In the first year of infantile life, the frequency is from 131 to 128 per minute. It diminishes in the second year to a little over 100. From 2 to 7 years of age it varies from 94 to 98, and from 7 to 21 years the average in males is 71, and in females 82. After 21 years the average is about 70 in men and about 71 in women. The normal frequency in advanced age is generally a little greater than in middle life. Instances of a frequency considerably above the average, as a normal peculiarity, are perhaps less numerous than the instances of notable infrequency; but a pulse of from 90 to 100 in healthy adults is not extremely uncommon.

The frequency of the pulse represents, as a rule, the number of the ventricular systoles. There are exceptions to this rule, some contractions of the left ventricle, under certain circumstances, being not sufficiently strong to produce an appreciable pulsation of the radial artery. All the ventricular systoles are not then represented by the pulse at the wrist. This occurs in some cases of cardiac disease and of functional disorder of the heart. It may occur when the ventricles are overloaded with blood, irrespective of either functional disorder or cardiac lesions. The error of considering, in these cases, the pulse as representing correctly the ventricular systoles is avoided by auscultating the heart and comparing the number of the heart-sounds with the radial pulse. Generally in the cases referred to, each ventricular systole is represented by an appreciable pulsation of the carotid artery.

The frequency of the pulse is increased by a great variety of transient causes which do not occasion disease. The process of digestion often increases the pulse to the extent of ten or more beats per minute. This is especially observed after the ingestion of stimulating articles of food or drink. It is a matter of common observation that physical exercise and mental emotions increase the frequency of the pulse. Posture has a decided influence on the pulse; it is less frequent in the sitting than in the standing, and still less in the recumbent posture. Allowance is to be made in cases of disease for variations due to these causes.

The frequency of the pulse is more or less increased, with rare exceptions, whenever fever exists. This holds true alike in the essential fevers, and in the febrile movement incident to acute inflammations. In these connections increased frequency of the pulse is associated with an increase of the temperature of the body as shown by the thermometer. The frequency of the pulse is, in a measure, a criterion of the intensity of the fever, although less reliable than the increase of temperature. Its significance has relation especially to the forces carrying on the circulation, or, as is commonly said, the vital powers. If an abnormal frequency be more than moderate, it denotes weakness of the heart's action, and the weakness is great in proportion as the pulse is frequent. In fevers and acute inflammations, assuming the patient to be an adult, and the normal pulse to be near the average of health, a frequency of 100 or 110 per minute, is not necessarily associated with notable weakness of the heart's action; but a pulse of 120 denotes considerable, and beyond this, if persistent, great, weakness. The danger of dying by asthenia may be estimated by the frequency of the pulse. With respect to prognosis the variations in frequency of the pulse from day to day furnish important information, and valuable indications for treatment are derived therefrom. Prior to the employment of the thermometer in clinical medicine, physicians relied chiefly upon the frequency, together with other characters, of the pulse in judging of the favorable or the unfavorable course of fevers and acute inflammations. From the constancy of more or less increased frequency of the pulse in these diseases, it follows that they may be excluded when the pulse is not more frequent than in health. As a rule, with some exceptions, this statement is correct.

In chronic inflammations the frequency of the pulse is a guide in judging of the degree of constitutional disturbance, or the tolerance of them by the system. For example, in pneumonic phthisis, other things being equal, the disease may be said to be telling upon the powers of life in proportion as the pulse is persistently frequent. This symptom has an important bearing on the prognosis, and on the propriety of sending patients far away from home; the same is true of other chronic affections.

In nervous affections the pulse often becomes notably frequent, but the frequency is temporary. It is in many instances due to mental excitement at the time when the pulse is counted. A transient frequency, however great, is not evidence of fever, inflammation, or any grave affection. It is not uncommon for the action of the heart to be excited by the visit of the physician. It is a good rule, therefore, if the pulse be frequent at first, to count it afterward or repeatedly, before the visit ends. A comparison after an interval of a few moments sometimes shows a striking contrast. In many of the cases of neuralgia simulating, as regards pain, inflammation, *e. g.*, intercostal neuralgia and enteralgia, the pulse retains its normal frequency, a fact which, in conjunction with the temperature, establishes the diagnosis of a neuralgic affection.

It is customary to note the frequency of the pulse with exactness by the watch. This has been objected to on the ground that it tends to excite apprehensions in the minds of patients. The objection has little weight. The advantage of counting is considerable, for the reason that exact knowledge of the frequency is often too important for reliance to be placed on guessing. Especially during the course of acute disease it is desirable to determine with precision the variations from day to day with reference to prognosis and treatment.

The foregoing facts in regard to abnormal frequency of the pulse are derived from clinical observation. The question why the pulse is more or less frequent in fevers and acute inflammations, cannot, with our present knowledge, be satisfactorily answered. Marey's researches show that the frequency has relation to arterial tension. Lessening the tension increases the frequency, and *vice versa*. Diminished arterial tension, however, hardly suffices to explain the frequency of the pulse in fevers and acute inflammations. That the frequency is due to the increase of temperature is not consistent with the fact that there is often a considerable difference between the degree of frequency and the amount of increased temperature.

Notable increase in the frequency of the pulse without fever, is a symptom of exophthalmic goitre. In this affection the pulse may be from 110 to 120 per minute, and this frequency is tolerated for months and years. A fair inference is that in acute diseases the danger to life is not occasioned by the frequent action of the heart *per se*, but by conditions which it represents.

Diminished Frequency of the Pulse.—An abnormal infrequency in cerebral affections denotes compression of the brain from congestion, the presence of serous effusion, exudation of lymph, or extravasated blood. It occurs at the time of convalescence in fevers and some inflammations, *e. g.*, pneumonia, and under these circumstances has not an unfavorable significance. It is a feature of a rare variety of functional disorder of the heart. It has diagnostic significance in cases of hepatic colic. It occurs in cases of cholæmia or jaundice. It is an effect of certain remedies such as digitalis, aconite, and the veratrum viride.

It may be a normal peculiarity. Some persons in full health have a pulse of 40 or even less. In these persons a pulse of the average frequency denotes disease; hence, the importance of knowing the peculiarity of patients in this respect.

Quickness and Slowness of the Pulse.—The term quick is often applied to the pulse in a sense synonymous with the term frequent. This is an incorrect application. Quickness denotes the sensation which the arterial pulsations give to the finger—a sensation of abruptness or celerity (*pulsus celer*). A pulse may be more or less frequent without being quick, and the latter may be marked when the frequency is normal. The graphic delineation of quickness is a vertical line of ascent.

A quick pulse implies doubtless a corresponding quickness of the ventricular contractions. But it represents especially weakness of arterial tension. Excitation of the heart, with weak arterial tension, gives to the form of the pulse as traced by the sphygmograph, what is termed amplitude, that is, a lengthened line of ascent. The oscillation or rebound in the line of descent, known as dicrotism, is exaggerated, and may sometimes be felt with the finger, constituting the *pulsus biferiens*. A degree of dicrotism sufficient to be appreciated by the touch, is a rare symptom. It may, however, be so well marked as to give the impression that it represents a feeble ventricular systole alternating with one of much greater strength. Auscultation of the heart-sounds will correct this impression. The sphygmograph shows that the second pulse occurs in the diastole of the heart, and the trace in the descending line shows also exaggerated dicrotism when it is not perceived on feeling the pulse.

In a clinical view, the practical point is not to regard a quick pulse with an amplitude which may render it "bounding," as representing fairly the force of the heart's action. The tactile sensation is in this respect delusive. While it is evidence of a certain amount of ventricular force, it represents especially feeble arterial resistance, or, in other words, relaxation of the small arteries in consequence of which the blood passes with facility into the venous system.

Quickness and the sensation of force are the characters of the pulse in the essential fevers, and in paroxysms of hectic fever. The pulse, however, is often quick in non-febrile affections. The characters just named are strongly marked in cases of free aortic regurgitation.

The term slowness, applied to the pulse (*pulsus tardus*) should be used in a sense antithetical to quickness, denoting, not infrequency, but a slow, as contrasted with a quick, impulsion against the fingers. If this character be marked, the artery seems to pulsate sluggishly. This sensation disconnected from other characters may lead to an underestimate of the force of the heart's action,—an error which may be corrected by auscultating the first sound of the heart over the situation of the apex, the auscultatory evidence of the power of the ventricular systole being the intensity, length, and duration of the first sound in that situation. The tactile sensation of the apex-beat may also give evidence of power. The graphic character is the comparative obliquity of the line of ascent.

The significance of slowness is the resistance afforded by arterial tension. By hemorrhage or the abstraction of blood, a slow pulse may be changed to one which is quick, and giving the sensation of increase of force, the change being due to diminution of arterial tension.

Hardness and Softness of the Pulse.—A hard pulse (*pulsus durus*) offers an abnormal resistance to the pressure of the fingers. When the resistance is notably great, the pulse is said to be incompressible. The hardness is proportionate to the power of the heart's action, and the degree of arterial tension. To determine the relative agency of these two factors by the touch, is not easy. The power of the heart's action may be estimated by the auscultatory characters just named of the first sound over the apex; and the degree of arterial tension is shown by the line of descent in the form of the pulse as registered by the sphygmograph. The graphic traits of a hard, slow pulse are, small amplitude, an oblique line of ascent and an outward curve of the line of descent, the dicrotic wave being slight or wanting.

By venesection, or the use of remedies which lessen the degree of arterial tension, the pulse is rendered quick, and this, with an increase of amplitude, gives a sensation of greater force, the frequency being also increased. So far as the touch is concerned, however, the most reliable criterion of the actual force or strength of the pulse is the sense of resistance or incompressibility.

The pulse is soft (*pulsus mollis*) when the sense of resistance to the fingers is slight. Softness is the opposite of hardness, and represents feebleness of the ventricular contraction. A soft pulse which is also quick and has considerable amplitude, may give a delusive sensation of force. The sensation may be considered as delusive whenever the pulse is found to be notably compressible. An extreme degree of softness gives a sensation, as if air, not liquid, circulated in the vessel, hence the expression "gaseous pulse."

Fulness and Smallness of the Pulse.—The pulse is said to be full when the size of the artery is large, giving the sensation of being filled or distended with blood (*pulsus plenus vel magnus*). This character denotes vascular repletion. Other and opposite characters may be therewith conjoined. A full pulse may be more or less frequent, quick or slow, hard or soft. Disconnected from other characters, fulness has no special diagnostic or pathological significance. It has no distinct graphic expression. As evidence of plethora, or that the quantity of blood is abundant, it may be taken into account in judging of the propriety of the abstraction of blood or other measures of depletion.

The pulse is abnormally small (*pulsus parvus*) when the size of the artery seems to be diminished. Within a certain limit, smallness of the pulse does not imply deficient power of the heart's action. What is known as the "wiry pulse" is small, but not wanting in force. This is observed in cases of acute peritonitis, and also in other affections. Beyond a certain limit, however, a small pulse represents weakness of the ventricular systole. In an extreme degree the pulse is described as filiform or thready. This precedes the extinction of the pulse, when death takes place by slow asthenia.

A pulse gradually becoming smaller and weaker, in chronic diseases, is evidence of their progressive inroad on assimilation and the powers of life. These characters are rapidly induced in diseases which occasion the state of collapse, of which epidemic cholera is a striking illustration.

The size of the pulse, in conjunction with that of force, thus enters into the prognosis in certain chronic and acute affections. The pulse, however, becomes exceedingly small, and even extinct, transiently, in connection with profuse hemorrhage and nervous disorders which tend to produce syncope.

Strength and Weakness of the Pulse.—The modifications belonging under this head have been referred to in connection with the other characters. A sensation of increased force of the pulse is incident to quickness and a large amplitude, indicating low arterial tension or a feeble blood-pressure, rather than increase of the power of the ventricular systole. Abnormal strength is incident to hardness of the pulse, indicating cardiac power and strong arterial tension. Weakness of the pulse is shown by a feeble resistance to pressure, that is, softness, and may be associated with either fulness or smallness.

Irregularity of the Pulse.—A form of irregularity is the want of uniformity in the rhythmical succession of the arterial pulsations. This irregularity may be either constant or occasional. A series of regular beats, that is with normal rhythm, may be followed at short intervals by a series with a more rapid succession; in other words, variations in frequency may occur during the time that the fingers are applied over the artery. This occasional irregularity occurs in nervous subjects, and may be due solely to emotional influences. A constant irregularity is when the beats succeed each other without any regard to rhythm. This irregularity may, or may not, denote a corresponding irregularity in the heart's action. The heart may act with regularity, more or less of the ventricular contractions not having force enough to be represented by a radial pulse. Reference has been made to this fact already in connection with frequency of the pulse. To determine discordance or otherwise between the pulse and the heart, the physician should auscultate the heart while his fingers are on the artery.

Another form of irregularity is when the successive pulsations lack uniformity in force; some beats are relatively strong and others weak. The pulse is then said to be unequal.

These two forms are often associated. Exclusive of cardiac affections, they occur in diseases which occasion notable obstruction of the pulmonary circulation, namely, pneumonia affecting two or more lobes, capillary bronchitis, œdema of the lungs, pleurisy with large effusion taking place rapidly, and hydrothorax. A pulse in these diseases, irregular in rhythm and unequal, together with weakness, denotes over-distension of the right cavities of the heart and an insufficient supply of blood to the left ventricle. In conjunction with the characters of the pulse just named, there is more or less lividity from cyanosis. These symptoms appearing rather suddenly and perhaps unexpectedly, more especially in cases of pneumonia, render probable the formation of thrombus or a heart clot in the right cavities. Without, as well as with, this event they render the prognosis extremely unfavorable.

Intermittency of the pulse is another form of irregularity. The heart's action is suspended for a period which would have been occupied by one or more of beats occurring in regular succession. Intermissions may occur with the other forms of irregularity. Occurring with regularity in other respects, they may denote a normal peculiarity; some persons have an intermittent pulse which is natural, and the pulse in some persons becomes intermittent with advancing years, without other evidence of disease. Under these circumstances it has no special significance. A marked point of distinction when it is not a morbid symptom is, it occurs unconsciously; whereas, when it is a symptom of functional disorder of the heart, the patient is painfully conscious of it, and it is apt to excite much apprehension of sudden death, although attended with no actual danger. The tracings of the sphygmograph show that the pulsations directly following intermissions have an increase of force.

An approach to an intermission occurs in what has been called a "faltering pulse." This form of irregularity consists in a little delay, from time to time, in a pulsation. Now and then a pulsation seems to lag. It is a symptom in cerebral affections, and is sometimes of value in diagnosis.

The study of the circulation within late years has tended to lessen the reliance on the tactile characters of the pulse in diagnosis. Many of the numerous nice distinctions formerly made have ceased to be regarded.

The interpretation of obvious abnormal modifications was in certain respects erroneous, the influence of arterial tension, as caused by contraction or relaxation of the capillaries and small arteries, having been imperfectly understood. For our present knowledge of the latter, clinical medicine is much indebted to the researches of Marey, by means of the sphygmograph.

It cannot be said of the pulse that it furnishes diagnostic symptoms of particular diseases, but it enables the physician to judge of important pathological conditions involved in different affections. It suffices for the exclusion of fevers and acute inflammations, and in this way is of much aid in diagnosis. It affords information concerning the favorable or unfavorable progress of acute and chronic diseases, and is thus of value in prognosis. It supplies rational indications for treatment relating to the frequency and strength of the heart's action, and the employment of measures for either increasing or diminishing arterial tension. In these several practical aspects the characters of the pulse claim careful study and attention.

Symptoms relating to the Temperature of the Body.

The experience of the last twenty years has shown the thermometer to be a precious addition to the resources of clinical medicine. Subjective symptoms relating to temperature are untrustworthy. A patient during the cold stage of a paroxysm of intermittent fever suffers from a sense of coldness, while the thermometer in the rectum, mouth, or axilla shows the heat of the body to be increased. In the collapse of cholera the patient has no sensation of coldness, although the body-heat is below the normal limit. Even if the feelings of the patient be correct as regards the heat being either above or below the range of health, they are not to be relied upon as evidence of the amount of elevation or depression. Nor are the sensations communicated by the touch reliable. The surface may be cool or cold to the hand when the temperature of the body, as registered by the thermometer, is more or less raised, and the body-heat may be but little above the normal limit when the surface seems to the touch intensely hot. The propriety of an accurate measurement of the temperature in cases of disease is now so apparent that the fact of thermometry having been in vogue for only a few years cannot but excite surprise.

Clinical Thermometers.—The clinical thermometers now used vary in size, length, form, and in other respects. A capital point in selecting one to be used in visiting patients is convenience for carrying in the pocket. The accuracy should be properly tested. A self-registering thermometer is to be preferred, but it is desirable that the scale should be sufficiently distinct to be read while the instrument is *in situ*. In this country Fahrenheit's scale is almost invariably used. This is a source of embarrassment in reading French and German works, in which the degrees of temperature are given according to the Centigrade scale. The rules for converting the degrees of each scale into those of the other are as follows: To convert the Centigrade into the Fahrenheit degrees, they may be multiplied by 9, divided by 5, and 32 added. *Per contra*, to convert the Fahrenheit into the Centigrade degrees, multiply by 5, divide by 9, and deduct 32.

Situations in which the Thermometer may be Applied.—There are three situations in which the thermometer may be applied to determine the body-heat, namely, the rectum, the mouth, and the axilla. The vagina is sometimes selected. It is to be regretted that physicians differ in the choice among these situations, inasmuch as the temperature, taken simultaneously, either in health or disease, is not alike in each. For this reason uniformity as regards the situation is desirable. As a rule, the axilla is to be preferred, on the score of convenience and delicacy. Save in exceptional instances, as when the temperature of a patient in a cold bath is taken, the axilla answers all practical purposes. There are obvious reasons why the rectum should not be selected whenever the axilla will answer as well. It is inconvenient for a patient to hold the instrument in the mouth for a sufficient length of time, and it is impracticable to make the application here in children, or in cases of delirium and coma. So long as there is not uniformity among physicians in the situation selected, it is important in reporting cases to specify that in which the temperature was taken, inasmuch as it is generally about a degree higher in the rectum than in the axilla, and, if precautions be taken to prevent respiration through the mouth, it is somewhat higher in this situation.

Rules in taking Temperature.—In taking the axillary temperature, certain rules are to be observed. If there be perspiration it should be wiped away from the axilla before the instrument is applied. The bulb of the thermometer should be placed in the centre of the axilla, the arm should be brought forward over the chest, and firm pressure by the physician or an assistant, of the arm to the chest, should be continued until the instrument is removed. The instrument should be allowed to remain in the axilla at least ten minutes. If the scale can be distinctly seen while the instrument is *in sitû*, it may be removed when the mercury has remained stationary for a minute. If these simple rules be explicitly stated, an intelligent nurse or assistant may be trusted to take the temperature in the absence of the physician. If this be done, a self-registering thermometer should be used, and the registering portion of the mercury not disturbed until after an inspection by the physician.

Normal Thermometry.—Certain laws of normal thermometry must be known before entering upon the study of those which pertain to disease. The average axillary temperature in health is from 98° to 99° Fahr. These degrees do not express fully the range of variation within the limits of health. The temperature may be raised a degree by active muscular exercise, or a full meal, and it may be somewhat lowered by mental labor, or in exhaustion following physical exertions. Other causes not always appreciable may produce, within a limited range, a temporary rise or fall of the average temperature. The normal temperature, moreover, fluctuates during the twenty-four hours irrespective of any special cause. It is lowest early in the morning, and highest late in the afternoon, the range of diurnal fluctuation being from one to two degrees. The practical rule for distinguishing a morbid temperature is this: An increase from one to two degrees is not to be considered as morbid, provided there be present no other symptoms of disease, until it has been ascertained that the rise has persisted for at least several hours. This rule is based on the fact that a slight or moderate rise of temperature irrespective of disease is of transient duration. A similar rule applies to a temperature somewhat below the ordinary healthy average.

Thermometry in Disease.—The variations of temperature which are symptoms of disease may be either below or above the normal range. The latter variations are vastly more frequent than the former.

A morbid increase of temperature is the evidence of the state of fever. Either some one of the essential fevers exists, or the fever is symptomatic of some local affection. If the temperature of the body be not morbidly increased, a patient can be said to have neither an essential nor a symptomatic fever.

A temperature, therefore, below the maximum of healthy variations, is sufficient to exclude all febrile and acute inflammatory diseases. This law holds true if instances be excepted in which the temperature falls within or even below the normal limits as an effect of certain events, such as hemorrhage, or in which it has been reduced by measures of treatment. The ability thus by means of the thermometer to eliminate at once diseases which occupy a large space in nosology, renders this little instrument of immense value in diagnosis.

With reference to the exclusion of febrile and inflammatory diseases, it is desirable that thermometry be made popular. Every intelligent family should be provided with a clinical thermometer, and instructions be given respecting its use. By ascertaining the axillary temperature, the non-medical observer may be enabled to judge, in cases of illness, as to the importance of obtaining medical aid without delay, and needless apprehensions may oftentimes be dispelled.

The amount of the increase of temperature indicates the degree of fever. The thermometer furnishes the only reliable criterion of the intensity of the febrile state. In this regard the temperature is of much more importance than the characters of the pulse. To express difference in degrees of fever, the terms high and low have long been used. These terms alone are lacking in precision. They must have adjectives of quantity in order to distinguish different grades with greater accuracy. A fever may be called low, if the temperature be under 102°. It is quite low, if the temperature be only 100°, and moderately so, if the temperature be 101°. A temperature above 102° is high; it is moderately high at 103°, considerably so at 104°, and very high if it be 105°; it is exceedingly high at 106° and upwards.

The term hyperpyrexia is applied to fever when very high, that is, when the temperature is above 105°. But the readiest, as well as the most accurate mode of expressing the grade of intensity of fever in a case of disease, is to state the actual temperature as registered by the thermometer.

The degree of persistent fever heat has a positive bearing on the prognosis. The following laws of thermometry in this aspect may be stated: A temperature of 105°, if it persist for twenty-four hours or longer, denotes considerable gravity of disease. If the temperature reach 106° and 107°, and persist, the danger to life is immediate and great. These high degrees of heat may, however, denote an intense febrile paroxysm, the fever diminishing or ceasing after a few hours. The author has noted a temperature of 110°, in a case of insolation which ended in recovery. A case, probably the most remarkable on record, as regards the amount of hyperpyrexia, and the persistence of an extremely high temperature, with recovery, was communicated to the Clinical Society of London by Dr. Ringer in 1875. In this case the temperature reached 122°, and during seven weeks it ranged between 108° and 110°. The case was one of fever after spinal injuries. Seven instruments were used in the observations, and every precaution taken to secure accuracy.[1] A case like this is an extraordinary exception to the ordinary rules which regulate the application of thermometry to prognosis.

Certain laws in relation to the increment of temperature, its acme (fastigium), its diurnal fluctuations, and its gradual or sudden decrease (lysis and crisis), enter into the clinical histories of fevers and acute inflammations. These will be noticed in treating of the diagnosis of individual diseases in subsequent portions of this work. The physician is liable to be misled by placing too much reliance on the laws of temperature. They are not infrequently interfered with by complications and accidental events. As an illustration, a young girl had passed through typhoid fever, convalescence being declared, in connection with other symptoms, by the laws of thermometry belonging to the decline of fever or defervescence in this disease. Suddenly hysterical symptoms were manifested, and the temperature rose to 105°. The physician, a man of learning and large experience, was naturally alarmed. In a few hours, however, the temperature declined, and recovery took place without further impediment. The expressive comment made by the physician was, "This is not the first time I have been fooled by temperature!" With regard to the information furnished by the thermometer, as well as to other diagnostic symptoms, it is to be borne in mind, that there are exceptions to rules which are generally applicable.

An aspect in which hyperpyrexia is of practical importance is its bearing on treatment. At the present time remedies and measures of treatment having for their object the reduction of temperature, hold a prominent place in therapeusis. These will be referred to under another heading in this Introduction, and in connection with the treatment of individual diseases.

As stated already, a decline of temperature below the normal limit is far less frequent than an abnormal increase. The following are conditions under which a decrease occurs:—

In cases of epidemic cholera characterized by algidity, the temperature may fall to 92°. The fall is considerable in some cases of the algid form of pernicious intermittent, and in certain instances of collapse occurring in other pathological connections. The temperature is lowered just before death in some chronic affections, whereas in fevers and acute inflammations the moribund state is often characterized by a notable increase of the body-heat.

In certain non-inflammatory affections which occasion disturbance of respiration or of the circulation, namely, asthma, emphysema, and some cardiac lesions, the temperature is below that of health. It is abnormally decreased in some cases of insanity, in the state of exhaustion due to sudden vomiting or diarrhœa, after prolonged muscular or mental exertions, in some cases of uræmia, in alcoholic coma, in inanition from obstruction of the œsophagus or other causes, and after long exposure to cold. A prolonged cold bath in cases of fever may be followed by a fall of temperature considerably below the minimum of health. Hemorrhages occasion an abnormal decrease of temperature. After venesection, however, the decrease is temporary, and an increase above the normal range is apt to follow. The occurrence of intestinal hemorrhages in cases of typhoid fever is sometimes rendered almost certain, before the evacuation of blood, by a sudden and considerable fall of temperature not attributable to any other obvious cause.

---

[1] Transactions of the Clinical Society of London, vol. viii. 1875.

Finally, in the defervescence which accompanies convalescence from febrile and inflammatory diseases, sometimes the body-heat, like the pulse, falls below the minimum of health. Under these circumstances the decline lasts but a few hours or days, and has no unfavorable significance.

In general, there is to a certain extent a correspondence between the temperature and the pulse. This statement applies to an increase of temperature. The correspondence, however, is by no means uniform; an abnormal variation of temperature is often in no measure denoted by the pulse.

Symptoms relating to the Tongue.

The symptoms which relate to the tongue, have reference to its color, its movements, its dryness, and the morbid deposits called coatings, together with other appearances upon its dorsal surface.

Pallor of the tongue and of the mucous membrane in other situations within the mouth, denotes impoverished blood or anæmia. A livid aspect is evidence of cyanosis, the lividity being more or less marked on the prolabia and face. An abnormal redness of the dorsal surface is not uncommon in the course of fevers and acute inflammations, especially after a coating has been thrown off; and, if the redness continue, another coating is apt to take place. Redness, and an excoriated appearance with soreness, characterize the anæmia induced by lactation, called the nursing sore mouth or stomatitis materna. A similar appearance occurs in some cases of phthisis, and in other affections attended with defective nutrition. When abnormally red and dry, the surface has a smooth and glazed aspect. An abnormal swelling of the papillæ with redness, the surface having an appearance which has been compared to that of a ripe strawberry—the strawberry tongue—is almost pathognomonic of scarlet fever, but by no means present in all cases.

There is no ground for the doctrine that notable redness of the tongue is symptomatic of inflammation of the lining membrane of the stomach or intestines. It is wanting often, if not generally, in cases of gastritis, enteritis, and dysentery, and it is present when neither of these affections exists.

Involuntary movements of the tongue denote morbid conditions of the nervous system. Tremulousness is a symptom of alcoholism, preceding often tremor of the hands and the mental manifestions of delirum tremens. It represents in cases of typhus and typhoid fever, and in the typhoid state incident to various diseases, notable muscular weakness. Occurring early in the fevers just named, it foreshadows gravity of disease. It is among the toxical effects of lead and mercury.

Symptoms relating to the voluntary movements of the tongue are significant of mental conditions. In typhus and typhoid fever, and in the typhoid state incident to other affections, the tongue is often protruded slowly and with difficulty, showing diminished power of the will over the voluntary muscles. Delay in protruding it, without any real difficulty, shows a lack of apprehension or a morbid sluggishness of mind. In some cases of fever and of cerebral diseases, a request to protrude the tongue has to be made repeatedly before an effort is made, owing to weakness of the mental faculties. And having been protruded, it may not be withdrawn until a request is made and perhaps repeated. Owing to mental hebetude the patient forgets that it is protruded.

It is a curious fact that patients will frequently protrude the tongue when they cannot be made to do aught else, owing to the state of the mental faculties.

Paralysis of the genio-hyoglossus muscle on one side, causes a lateral deflection of the tongue, the apex pointing to the paralyzed side. This is generally observed in cases of hemiplegia dependent on morbid conditions within the skull; also in some cases of facial paralysis, the upper and lower extremity not being affected. In the latter cases it is evidence that the paralysis is centric and not peripheral. In the affection known as glosso-labial or bulbar paralysis, the ability to protrude the tongue is impaired or lost.

Dryness of the tongue is a symptom in a variety of diseases, namely, in the essential fevers, and in symptomatic fever; in diabetes mellitus, and in polyuria from other causes than the presence of sugar in the blood, and in functional disorders of digestion.

The dryness varies in degree in different cases, and it may be a source of discomfort, or the patient may be unconscious of it. The dorsal surface sometimes becomes so dry and resisting that to the touch it has a horny hardness. This occurs especially in connection with typhus and typhoid fever or in the typhoid state. It denotes deficiency of mucus and the salivary fluids, together with deficient movements in consequence of blunted sensation and mental hebetude. Persistent somnolency, the mouth being open, contributes to it, the surface being desiccated by the current of air passing over it. Dryness from desiccation is an effect of the increased frequency of the respiratory acts in pulmonary diseases involving dyspnœa.

The terms furred and coated applied to the tongue, express a variety of appearances. It is said to be furred or frosted when either the papillæ are elongated by opaque epithelium, or the surface is white from a thin epithelial covering. The whole, or only a part of the dorsal surface may be furred, and, if limited, it is usually at the base, extending more or less towards the apex. Sometimes enlarged and reddened papillæ project above the epithelial covering, presenting an appearance as if grains of red pepper had been scattered over the surface. This appearance is observed especially in cases of scarlatina, the difference from the strawberry tongue being the opacity or the fur between the enlarged papillæ.

A furred tongue has no special significance. It is habitual with some persons who consider themselves well. Usually, however, it denotes some disorder of health. It occurs, as a rule, whenever febrile movement from any cause exists. Persons who suffer from disordered digestion are apt to have a furred tongue. A uniform, white, and thin covering, extending over the whole dorsal surface, giving an appearance as if the surface were chalked or covered with white paint, is often observed in patients with intermittent fever, and is sometimes called a malarial tongue. This is somewhat characteristic.

The tongue is said to be coated when the surface is more or less covered with a deposit, not very thin, but varying in thickness in different cases. To express different degrees of thickness, the coating is said to be thick or heavy, or the tongue is said to be loaded, and, on the other hand, the coating is light or thin. The coatings consist of epithelium, concrete mucus, dust inhaled with the breath, sometimes blood, particles of food, matters vomited, the latter, perhaps, containing bile, and parasitical growths. If neither coated nor furred, the tongue is said to be clean.

A coated tongue occurs in a host of diseases. It is evidence that the system is disordered, but it does not point to either the seat or the nature of the malady. There is no ground for the opinion that different appearances of the coating represent certain conditions of the gastric or intestinal mucous membrane. Clinical observation shows that the appearances denote disturbance of the system rather than any particular local affections.

The coatings vary in color. They are sometimes yellow, and are then said to be bilious: but the yellowness is not due to bile, even if cholæmia exist, and certainly not if no other evidence of jaundice be present. A bitter taste is not evidence of the presence of bile. There is no established connection between any condition of the tongue and disorder of the liver. The coatings sometimes become dark and even black, either from chemical changes or a little escape of blood. Contact with certain medicines, especially preparations of iron, alimentary substances, and matters which are vomited, may produce this effect. From the occasional occurrence of a very dark color of the coating in cases of the epidemic erysipelatous fever which prevailed in sections of this country many years ago, the disease was popularly known as the "black tongue." The coatings are sometimes dark and black in typhus and typhoid fever, and when the typhoid state is manifested in connection with any disease.

Coatings are sometimes shed and reproduced, once or repeatedly, during the course of fevers and in other diseases. If, when a coating be shed, the surface of the tongue be abnormally red, another coating is likely to follow. In general, shedding or thinning of the coating, and a normal color of the surface, are favorable symptoms, denoting progress towards convalescence. This is especially true in cases of fever. The improvement generally begins on the sides and at the tip of the tongue, extending gradually over the surface. When in the course of fevers, or other diseases in which the whole surface has been more or less heavily coated, the margins become clean, moist, and of a natural color, and the extent of coating lessens day after day, we may augur favorably as regards the probability of a speedy convalescence. The tongue is sometimes coated in irregular patches. This is exceptional, and has no special significance.

Coatings of the tongue may often be, in a measure, removed by frequently rubbing the surface with a soft cloth or sponge moistened with lemon juice or diluted vinegar, or scraping it gently with an appropriate instrument. This not only conduces to a sense of cleanliness and comfort, but, by removing an impediment to the sense of taste, it contributes to a relish for food, and is important whenever alimentation is desirable. In the management of fevers this is a matter which should not be overlooked by the physician.

The tongue varies in form and size in different diseases. There is considerable variation in these respects among healthy persons. It may be compact and triangular, or broad and flabby. These appearances have no special significance. Indentations on the margins may be produced by the pressure of the teeth. These occur if the organ be swollen; otherwise they simply show that it has remained in contact with the teeth for a considerable time. In health during wakeful hours the tongue is frequently moved, not remaining, except momentarily, in the same place. The indentations due to diminished movements denote mental hebetude.

The tongue occasionally presents fissures or cracks in the course of fevers, and these sometimes continue into convalescence. Cicatrices are observed in persons subject to epilepsy, as results of wounds inflicted by the teeth during the paroxysms. These may be useful in determining that paroxysms which a patient has experienced were epileptic in character. Coldness of the tongue belongs to the moribund condition, without reference to the disease, and it is a striking symptom in the algid stage of epidemic cholera.

Finally, the tongue has a normal appearance, not very infrequently, in different acute and chronic affections during the whole course of the disease.

From time immemorial the tongue has been considered as furnishing special information respecting the nature, seat, and progress of different diseases. Many of the notions which formerly prevailed, and which are still to some extent entertained, with regard to the significance of the varied appearances pertaining to the volume of the organ, its form, and the coatings, are without foundation. Custom has rendered a close inspection of the tongue so much a matter of course that patients would be likely to impute to the physician negligence were it to be omitted. In the popular mind there is a certain mystery connected with an examination of the tongue, which is kept up by the minuteness with which the organ is examined by means of the touch, as well as sight, by some practitioners. It may be said that undue importance is likely to be attached to the varied appearances which the tongue presents, in proportion to a lack of ability to appreciate other and more reliable symtomatic phenomena. Nevertheless, useful information may frequently be obtained by inspecting the tongue with reference to the points of observation which have been noticed.

Sources of Error in Diagnosis.

It is well for the student to consider, and the practitioner to be mindful of, the sources of error in diagnosis. It cannot be said of the skilful diagnostician *nascitur non fit*, and yet, undoubtedly here, as in other practical applications of knowledge, differences arising from natural capacity are obvious. There are those who never become expert in diagnosis, with ever so much learning, application, and opportunities for experience. Much will depend on efficient training during pupilage and early professional life. Other things being equal, the sources of error will be avoided in proportion as they are clearly apprehended.

Errors have their source in the difficulties inherent in this branch of clinical medicine. Problems in diagnosis arise which are by no means easily solved. The most skilful and experienced are liable to fall into errors. Were any one to assume infallibility in this regard, the assumption, if honest, would be proof of inability to discover mistakes, and, therefore, of ignorance. A proper appreciation of the liability to errors affords a security against them by inculcating reserve, while it should not impair unduly self confidence. "The more one believes in the possibility of error, the surer will he be to avoid mistakes."[1]

It cannot be otherwise than that errors should be committed by those whose acquaintance with pathological laws and the clinical histories of different diseases is limited. Other things being equal, one is the less likely to commit errors the greater his familiarity with symptoms, and the more accurate his appreciation of their relative diagnostic value. This practical knowledge is required alike for recognizing the direct evidence of diseases, the exclusion of other diseases, and the points involved in differential diagnosis. With reference to the requirements under this head, the practice of recording cases cannot be too strongly recommended.

Errors are apt to spring from precipitancy in arriving at a diagnosis. A conclusion is formed after a few facts only have been ascertained. The mind is then in the attitude of seeking for proof to sustain a premature conviction. In other words, the diagnosis is made by guessing, the subsequent investigation, if not omitted as unnecessary, having for its object to confirm the guess. The practice of diagnosticating diseases by a glance, or after a cursory examination, is to be reprehended. It is a temptation of egotism to exhibit a remarkable ability of insight in this regard, but it is certain to lead to mistakes. Careful examination and deliberation before reaching a conclusion are in no sense derogatory, but, on the contrary, they are the attributes of a philosophic mind, showing, moreover, a due appreciation of the importance of the object, and whenever the problem involves difficulty, the judgment should be held in abeyance until all available facts have been ascertained.

The judgment is apt to be affected by the mental temperament. Some physicians are prone to strive for a conclusion which is the most desirable. Their minds are biased by the hopes which their sympathy with patients leads them to feel, and by a tendency to look upon the bright side. Others are influenced by their fears, and an equal amount of sympathy leads them to look upon the darkest side. In order to avoid errors, the judgment should be exercised, as far as possible, independently of the sentiments, and the physician will do wisely to study his own mental constitution, in order to make a fair allowance for the tendencies which may prove sources of error. It is owing to the influence of the feelings upon the judgment, that physicians are often incompetent to form correct opinions in diseases affecting themselves, their families, or intimate friends.

---

[1] Liebermeister, in Ziemssen's Cyclopædia.

Simulation of Diseases.

To determine that diseases are feigned, sometimes taxes the knowledge and diagnostic ability of the physician. They who undertake this sort of deception are often called malingerers, a name which, in lieu of a better, may be adopted.

The objects for which diseases are simulated are various, and they are to be considered in making the diagnosis. In military and naval service, malingering is resorted to in order to obtain a discharge for disability, or to be placed on the sick report. It is a resource of cowards to avoid the dangers of battle. Prisoners resort to it to escape the punishment for crimes, and to obtain a pardon or a reprieve. It is a means of gaining admission into, and of being retained in, hospitals. The malingerers of the latter class, in this part of the world, are commonly called *bummers*. Mendicants feign diseases to obtain alms. Railroad companies, other corporations, and individuals are liable to be mulcted in damages for the effects of injuries which are either simulated or greatly exaggerated. Extraordinary efforts of deception are sometimes made purely to excite interest or compassion.

The physician is liable to be imposed upon by malingerers, and naturally he is chagrined when he finds that he has been duped. But there is a liability to the opposite error. This fact is not to be lost sight of. From a humane standpoint the latter is the more unfortunate error; and, in view of this, whenever there is any reasonable ground for doubt, a decision should be reserved. The author has known of two instances in which patients who were discharged from hospitals as malingerers, died before leaving, from the rupture of an aneurism.

There are cases of malingering in private practice, and these, aside from embarrassment in regard to the diagnosis, place the physician in a delicate position. Illness is feigned to provoke sympathy, to secure attention, to obtain favors, to escape duties, and to produce alarm. The author could cite, from his own experience, cases of deception for each of these objects. It must be said that the malingerers now referred to are much oftener women than men; but they are not always of the female sex. Among the cases which the author could cite are several in which men of middle age, whose intelligence and standing in society would exempt them from the suspicion of such a deception, feigned sudden illness, apparently in order to excite domestic apprehensions. In such cases, when the diagnosis has been made, these questions arise: Shall the patient be made acquainted with the physician's opinion? or, Shall it be communicated to the friends either in whole or in part? The answers to these questions must be determined, according to the discretion of the physician, by the circumstances in individual cases. No general rule can be laid down. The liability to error is to be borne in mind, and also the fact that, although professional pride may be piqued, it is better, both for the physician and patient, that the deception succeed, rather than to make a mistake in the opposite direction.

The number of diseases which are feigned with reference to the objects just named is large; in fact they form a considerable portion of the nosology. The means of discovering simulation will be noticed in connection with the diagnosis of individual affections. Malingerers rarely, if ever, are able to counterfeit all the diagnostic symptoms of any disease so perfectly as to render detection impracticable, and, therefore, failure to detect implies deficiency either in the investigation or in diagnostic ability.[1] Malingerers of the class last referred to, generally simulate illness on a sudden impulse, and do not mature any elaborate plan of deception. These cases are recognized in general terms by the absence of the diagnostic characters of any particular disease; the symptoms, which are wholly subjective, are vague and discordant.

Allied to the simulation of diseases, is an exaggeration of subjective symptoms when there is actual illness. The incongruity of these symptoms, and knowledge of the mental characteristics of the patient, are to guide the practitioner in making due allowance for exaggeration. Patients often seem to exaggerate greatly when there is no intention to deceive. The differences in susceptibility and fortitude, in different persons, are such that a degree of pain or of other forms of distress, easily borne by one, will be felt to be excessive by another.

The Objects, Ultimate and Immediate, in treating cases of Disease.

In treating cases of disease, the ultimate object which holds the first rank is recovery with complete restoration of health. If this be unattainable, the objects which remain are, the closest approximation to recovery, or, in other words, the least amount of deviation from health which can be secured, the best possible tolerance of the persistent morbid conditions, together with a minimum of suffering or discomfort, and the utmost prolongation of life. These are ultimate or remote objects. They are ulterior results, in a great measure, of treatment having reference to the objects which are immediate, and hence the latter concern more closely medical practice.

The immediate objects are the desirable results which it is intended shall follow directly or speedily the employment of measures of treatment; and the latter may be classified according to the immediate objects which they are designed to fulfil.

---

[1] For a table of the diseases which are apt to be feigned, together with the means of detection, *vide* Dunglison's Medical Dictionary, under head of Feigned Diseases.

A prime object in treating diseases, is the removal of morbific causes which may be still in operation. If a disease have proceeded from a specific cause, for example malaria, further exposure to this cause is, if possible, to be avoided. This object is especially important when, as is true of malaria, the susceptibility to the morbific influence of the cause is not destroyed by its actions within the system. It is of less importance when specific causes, having once produced the diseases which they occasion, are not afterwards operative, as is the case with the miasmas producing typhus fever, yellow fever, and the eruptive fevers. So also the continued operation of causes which are non-specific, such as those incident to habits of life, is to be prevented if possible. The primary importance of this object is sufficiently obvious to common sense. The resources of clinical medicine would doubtless be much increased were our knowledge of etiology extended beyond its present limits. Especially is the extension of our knowledge in this direction important in preventive medicine. The indications for treatment pertaining to this object, are distinguished as causal indications.

An object next in importance, is counteraction of morbific causes within the system as soon as possible after the first morbid manifestations; in other words, to cut short or to arrest diseases. The measures of treatment for this object, have been called abortive measures. The significance of this metaphorical term, is that, provided the measures succeed, the cause of the disease ends prematurely—abortion is procured. Experience has shown that some diseases are rendered abortive by certain measures of treatment; that is, they are arrested at the outset of the course which they would have pursued had these measures not been employed. The number of diseases which are in this category, with our present knowledge, is limited. With the advancement of knowledge, the number will doubtless be increased. As a striking example, malarial fever may be arrested with great certainty by quinia and other antiperiodic remedies. The *modus operandi* of abortive measures is at present not satisfactorily explained; the proof of their efficacy is empirical, that is, derived from experience. In judging of the efficacy of abortive measures, it is to be considered that diseases sometimes abort without any interference; they end prematurely of their own accord. This is true even of phthisis, a disease which in most cases tends to continue and progress.

An object which, after causal indications and abortive measures, has precedence, is the cure of diseases. The term cure is conventionally used to denote a controlling influence over diseases. To cure a patient, in the etymological sense of the term, is simply to bestow medical care. In the conventional sense, it is to contribute to recovery by means of therapeutical agencies. A cure is effected when a patient recovers chiefly in consequence of these agencies. Cure implies recovery; but it by no means follows from the fact of recovery that the patient was cured, as this term is commonly used; for, a considerable number of diseases tending intrinsically to recovery, this may be the termination under favorable, and sometimes unfavorable, circumstances without treatment.

On the other hand, a physician cures patients in the true sense, that is, cares for them, when diseases end fatally.

Curative measures are properly those capable of exerting a greater or less degree of controlling influence over diseases. According to this definition, the treatment may be curative when it is not successful in effecting a cure, as this term is commonly used. It is evident that measures may be curative in some cases, and, from a variety of untoward circumstances, not curative in other cases. Diseases may be more or less controlled, and yet end fatally. The controlling influence of measures employed with a view to recovery may be marked, although recovery does not follow. In fact, curative treatment may accomplish much in the way of modifying the intensity of disease and prolonging life in cases which end in death. Indications and measures of treatment will be considered in this work as entitled to be called curative, when experience shows that they contribute more or less to recovery in a certain proportion of cases. Examples of remedies which are curative are, opium in peritonitis and other inflammations, quinia and arsenic in certain neuralgic affections, salicin in acute rheumatism, colchicum in gout, etc. These and other remedies are curative because, in a certain proportion of cases, they either effect a cure or contribute thereto. The same is true of measures of treatment which are not medicinal, that is, measures other than the administration of drugs. Medicines and other measures of treatment, which are curative according to the foregoing definition, may also be employed for another object, namely, palliation, without reference to a curative effect.

Palliation of symptoms is often an important, and sometimes the chief, object in treating cases of disease. Intense pain or any kind of distress always furnishes an urgent indication for measures of relief. But palliative treatment is not restricted to the relief of suffering; it embraces measures for abating symptoms which are not painful nor distressing. For instance, the state of hyperpyrexia indicates antipyretic measures of treatment, although the high temperature may cause no apparent inconvenience. Palliative is thus symptomatic treatment. If purely palliative or symptomatic, it has no reference to recovery or cure. But measures may be both palliative and curative. Opium is of great value as a palliative remedy, and it often exerts a curative influence in addition to the relief of suffering. The reduction of a high temperature fulfils a symptomatic indication; but it is now considered as, in certain diseases, contributing in no small measure to recovery.

In many cases of disease the great object of treatment is expressed by the term Support. Under this head are embraced the measures which sustain the powers of life. The pertinency of the term support pertains more especially to those acute diseases which tend to destroy life by asthenia or exhaustion. The treatment which holds a corresponding place in subacute and chronic affections is called tonic or analeptic, embracing remedies which increase appetite, promote nutrition, and give tone to the system, together with appropriate alimentation and invigorating measures operating through the mind as well as directly upon the body. Supporting or sustaining measures are indicated, with more or less urgency, in a large proportion of acute diseases which involve danger from impairment of the forces carrying on the circulation. This danger is represented by symptoms which have been referred to in connection with the pulse. The measures consist of alcoholics, a nutritive diet, and tonic remedies. In some cases there is a notable tolerance of alcoholics, quantities being taken without any alcoholic excitation which, in the state of health, would have produced profound intoxication. In extreme cases it is sometimes of the utmost importance by means of these to "obviate the tendency to death." In certain self-limited diseases, if the patient can be kept alive for a few days, and, it may be, even for a few hours, the disease reaches the end of its course and convalescence ensues. Many lives are saved by the efficient and persevering employment of sustaining measures. Moreover, in diseases which do not tend to a fatal result, convalescence is rendered more speedy and rapid by the judicious employment of these measures.

The leading objects in treating cases of disease are those just briefly considered, namely, arrest, cure, palliation, and support. They include a multiplicity of subsidiary purposes for which measures of treatment are employed, varying in different diseases and in different cases of the same disease. These will be referred to more appropriately in connection with the treatment of particular diseases.

Hygienic Treatment in Cases of Disease.

Measures involved in the treatment of cases of disease are hygienic if they be neither medicinal nor remedial. Agreeably to this definition, hygienic treatment embraces diet, temperature, ventilation, climate, exercise, out-of-door life, and, in short, everything pertaining to mental as well as physical regimen. Hygienic measures play an important part in clinical medicine. Indications relating thereto will enter into the consideration of the treatment of individual diseases. A few general rules only will be here stated.

Alimentation forming an essential part of the sustaining treatment, whenever this is indicated the diet is of great consequence, and the practitioner should not fail to give to it due attention. In acute diseases there is rarely a desire for, or relish of, food, and it is often loathed. Solid food cannot be taken, and the diet must therefore consist of gruels, animal broths, and milk. In giving explicit directions for the preparation and administration of these, the following rules are to be observed: There is risk of over-ingestion, but none of over-assimilation. It is desirable that as much food should be ingested as will be assimilated. As there is no method of determining with exactness the quantity which will be assimilated, either too much or too little may be given, and it is better to incur risk of the former rather than of the latter, because the evils of insufficient alimentation are greater than those of a superabundance of food.

Of the several forms of liquid food, milk is the most valuable, because it holds in combination all the different alimentary principles. Were the diet to be limited to a single article, this is by far to be preferred on that account. But it is desirable that the articles be varied, and, therefore, different forms should be given in alternation. Milk as well as different farinaceous articles may enter into the composition of gruels, forming what is called in some sections of this country, porridge. Whey and cream are devoid of the most nutritious principles of milk; buttermilk, however, containing the nutritious principles minus the fat, is a fair substitute.

The animal broths, as a rule, do not contain a large amount of nutriment, unless prepared without ebullition, and with the addition of nitro-muriatic acid, or the solid residue of the meat be dried, pulverized, and added. Broths, however, may be made highly nutritious by the addition of farinaceous articles. Ordinary beef-tea has very little nutritive value, and the so-called meat extracts in use are only useful as stimulants, conveying into the system very little material for nutrition. These facts are opposed to popular notions which practitioners should take pains to correct. Experience is yet to determine the advantages of giving meat partially digested, and fats emulsionized by the pancreatic juice before being ingested. Theoretically these methods of preparation would seem to have important advantages.[1]

The intervals between the administration of food should not be long, but they are often much too short. It is rarely judicious to give food several times within an hour. In general, two hours at least should intervene. The length of the intervals should depend on the quantity given at a time. This will depend on the ability of the patient to take it, and the tolerance of it, together with the evidence of its being digested. If food occasion neither vomiting, flatulency, nor diarrhœa, it is fair to assume that it has been digested, or, at least, that it has not proved hurtful.

The persistent employment of the same articles of diet, prepared in precisely the same way, day after day, is never judicious. The patient acquires a disgust for them, which becomes at length intolerable, and, for this reason, they are not only given with difficulty, but they are not likely to be digested. The articles and the modes of preparation should be varied. This rule, which is of much importance, is often not observed. All the circumstances connected with the administration of food should be arranged, as far as possible, with a view to render it acceptable.

The foregoing rules apply to cases in which sustaining measures are indicated. In other cases of either acute or chronic disease, as a rule, with some exceptions, *e. g.*, diabetes mellitus, the instincts of the patient should govern the dietetic treatment. Much as this rule is in opposition to ideas which prevail with physicians, as well as the public, the author believes that experience confirms its correctness. It is generally safer to follow the patient's inclinations as regards the quantity of food taken, and the articles of diet, than any notional or theoretical ideas. More harm results from an attempt to conform the diet to any plan of restriction, than will be likely to follow an unrestrained alimentation. The appetite and taste in disease as well as in health, generally represent the needs of the system, and are more reliable than rules derived from speculation or reasoning. This doctrine has the merit of great simplicity; it divests of difficulty the dietetic treatment in cases of disease.

---

[1] *Vide* Pavy, on Food and Dietetics, Am. edition, 1874.

The importance of endeavoring to secure an adequate alimentation in acute diseases, is to be measured by the fact that many of the grave phenomena which they manifest are attributable to inanition, and in many instances patients literally die from starvation. In chronic diseases it is obvious that defective nutrition stands in a direct causative relation to decreased weight and weakness of all the functions of the body.

Physicians are expected to regulate the quantity and kind of drink which patients are to take. Thirst is usually a prominent symptom in acute diseases, if the perceptions have not become blunted, and, in general it expresses a requirement which should not be opposed. The common belief that a craving for fluids should not be gratified, is a part of the popular error which regards all the desires in cases of disease as morbid, and, therefore, not to be considered in the light of indications for treatment. This error has stood in the way of not only relief of suffering, but the favorable course of diseases. With some exceptions which relate to other indications in particular cases of disease, the quantity of drink in a given time is to be regulated by the desire for it. Experience shows that it is often better for drink to be given in a small quantity at a time after short intervals, than for a large quantity to be taken at once.

When the perceptions are much blunted, the need of the system for fluids is not expressed by the sensation of thirst. The patient does not ask for drink; and yet, when roused sufficiently and drink be offered, it is often taken with avidity. As with food, so with drink; under these circumstances the judgment of the physician should take the place of the instincts of the patient. The system requires fluids and they are to be given systematically, and largely enough to meet the supposed requirements, bearing in mind that it is better to exceed rather than fall below the quantity required.

As regards the kind of drink, when thirst is a prominent symptom, pure cold water is generally the most acceptable. The carbonic acid water is sometimes exceedingly grateful. Toast water has the advantage of being slightly nutritious. Usually, if more agreeable, water may be acidulated with the juice of the lemon or orange. Tamarind water makes a pleasant drink. The mineral acids added for a remedial influence in the continued fevers, may be taken without giving to the drink the character of a medicine.

The temperature of hospital wards or sick rooms, and ventilation, claim attention on the part of the practitioner. Popular errors in regard to these elements of hygienic treatment, prevail largely, notwithstanding the efforts within late years to popularize correct sanitary rules in health and disease. In private practice especially, if pains be not taken to prevent it, the temperature of the sick room is apt to be too high, from a common belief that a cold or cool atmosphere is attended with danger in cases of acute disease. The reverse is much nearer the truth. Breathing a cool or even a cold atmosphere is refreshing and invigorating. A sufficient warmth of the body can always be maintained by clothing. The latter is apt to be too abundant. Here, as in other matters relating to hygiene, the sensation of comfort, if the mental perceptions be not blunted, is a trustworthy guide. As a rule, the temperature of the room should not exceed 60° Fahr., and, when practicable, should be regulated by the thermometer. In affections which interfere with respiration, breathing a much cooler atmosphere than this may lessen the suffering of the patient and conduce to the welfare in other respects. The popular apprehensions of harm from temporary exposure of the body to a cool or even cold atmosphere, are groundless. Physicians not infrequently err in sharing these apprehensions. Patients with acute diseases rarely "take cold." Indeed, in fevers, what may be termed the cold air bath diminishes the body-heat, and thus, as an antipyretic measure, is useful, although less efficient than the use of cold water for this purpose. In the inflammatory affections of the air passages, however, breathing constantly a very warm and moist atmosphere, has a salutary local effect, and, in some of these affections, is an important measure of treatment.

Purity of the atmosphere is a most important hygienic condition. Every one has experienced the lassitude and general *malaise* which follow breathing, even for a few hours, the vitiated atmosphere of a crowded, illy ventilated theatre or lecture hall, and yet the physician often finds the atmosphere of the sick room so confined and impure as to be equally or even more oppressive. Such an atmosphere cannot fail to have an unfavorable influence on patients. Physicians should not consent to treat cases of disease in small bed-rooms unless it be a matter of absolute necessity, and the freest possible ventilation should be enforced. The exclusion of sewer emanations is of vast importance, and attention to this point should not be omitted. The exclusion of light is often carried too far. A darkened sick room has an unfavorable moral and physical effect. Experience has abundantly shown that cases of acute disease are treated more satisfactorily in tents, and even in the open air, than in hospital wards or apartments in which the advantages of a pure atmosphere cannot be secured.

The propriety of a change of climate is to be considered in connection with the treatment of certain chronic affections, more especially of phthisis. Exercise and out-of-door life, also, will be referred to in treating of individual diseases. It may be remarked here, that during convalescence from acute diseases, unless contraindicated by circumstances peculiar to certain diseases, *e. g.*, the intestinal lesions of typhoid fever, gestation, or judiciously regulated exercise, and the influence of the open air, promote appetite, digestion, and expedite restoration to health. The duration of convalescence is not infrequently unduly prolonged by too long and close confinement within doors, from groundless apprehensions of "taking cold." The laws of diseases in respect to a liability to relapse, are to be taken into account in the treatment during convalescence. In most of the acute diseases produced by a specific cause, relapses occur as rare exceptions to the rule. Examples are typhus and typhoid fever, all the eruptive fevers, and yellow fever. Pneumonia is a disease which very rarely returns during convalescence. In these diseases, the object of the management after convalescence has taken place, is to promote the restoration to health chiefly by hygienic measures.

In addition to the foregoing classes of hygienic measures, those which produce effects through the mind are of no small importance. Occupations which divert the thoughts from morbid sensations, or which prevent introspection and watching the different functions of the body, are often of vastly more consequence to the welfare of patients than the administration of drugs. Judicious recreation is a potential measure of treatment in functional affections of the nervous and the digestive system. Much often depends on the cheerful surroundings of patients as regards recovery, as well as the preservation of health. It is no disparagement of the prescriptions of the physician to say that they are often of less value than the moral effect of his encouragement, for it is intended by this statement only to express the great importance in many cases of the latter.

In the treatment of cases of acute disease, the varied details embraced under the name "good nursing" have an importance which the public and many physicians have hitherto not sufficiently estimated. The most skillful and judicious methods of treatment may prove of no avail from the want of the co-operation of intelligent, instructed, and faithful nurses. The education and training of nurses should be considered as a part of the benefits derived from hospitals. Schools for this object are to be reckoned among the most useful of institutions in behalf of the interests of humanity.

Medicinal Treatment in Cases of Disease.

Remedies will of course hold a prominent place in discussing the treatment of individual diseases. Some general considerations may be appropriately presented in this Introduction.

Active treatment in cases of disease may be potential for either good or harm. In other words, there are therapeutic measures which, if not useful, will be hurtful. This statement applies to bloodletting, powerful cathartics, emetics, mercury, etc. Now, it is to be assumed as a governing principle in clinical medicine, that the first duty to the patient is not to do harm. Whenever, therefore, the physician makes use of a remedy which, if it do not benefit, will be injurious, it should be clear to his mind that the remedy will accomplish the object intended, and that the accomplishment of the object is desirable. If there be doubt on these points, duty to the patient requires forbearance in the use of the remedy. Exceptions to this rule are rare. Resort to a treatment which, if it do not cure, will kill, would be never justifiable. On the other hand, there are remedies which, under certain circumstances, are potential for good, and which, if not beneficial, will do little or no harm. Opium and full doses of quinia are in this category. Before resorting to active treatment in cases of disease, the question is to be considered, What will be the consequence if it fail to be of service?

Active treatment should always have reference to a distinct purpose subsidiary to the general objects in therapeutics, namely, arrest of disease, cure, palliation, or support. Remedies of potency, resorted to without any aim, if they do neither good nor harm, tend to disturb or obscure the symptomatic phenomena of the disease, and for this reason are not advisable.

Knowledge of the clinical history and laws of different diseases, has an important bearing on the treatment. What is the intrinsic tendency of the disease as regards recovery or a fatal termination? what is its duration? are certain symptoms likely to continue or cease spontaneously? These are among the questions to be considered in the interpretation of therapeutic indications. Other things being equal, he is the best therapeutist who knows best the symptomatology of diseases and their natural course, this knowledge having been acquired by observations at the bedside.

Indications for active treatment are by no means always proportionate to the severity of a disease or the danger attending it. The desire to employ powerful remedies in severe and dangerous cases is natural, and, moreover, it is a natural desire to meet in this respect the wishes of patients or their friends; but it is a part of the mental discipline of the physician to restrain these desires, and to follow only clear indications according to his knowledge and experience.

It is a good general rule to employ but few remedies at a time in treating cases of disease. If a patient take a multiplicity of remedies, either in combination or at different hours during the day, the effect of each cannot be well observed. If the treatment appear to be useful, the physician is unable to judge which of the remedies it is desirable to continue, or he is not able to decide which to discontinue if the treatment appear not to be useful. Moreover, the physician gains an imperfect experience by treating cases with a multiplicity of remedies. An exception to this rule is the combination of different remedies of the same class to secure a greater effect, as when different diuretics or laxatives are combined. Simplicity in prescriptions is to be commended. Formulæ embracing numerous ingredients of no essential importance, are to be discountenanced as a remnant of medical pedantry. At the present time the country is flooded with medicinal preparations, in which different remedies are combined, emanating from apothecaries and manufacturers of drugs. In general, these should be employed by physicians with great reserve and discrimination. As a rule, preference is to be given to officinal preparations recognized in pharmacopœias. There is no objection, however, to devising means to render the administration of medicines easy by divesting them of repulsiveness to the taste and smell. The compression into a small volume, coating with sugar, inclosing in capsules or wafers, and preparing as confections, have been of great service in this regard. The unpleasant taste of certain medicines given in solution or mixture may generally be avoided by a very simple procedure, as follows: Let the breathing be carried on exclusively through the nostrils until the medicine is swallowed and several mouthfuls of water or some other drink have been taken. In this way are rendered tasteless all remedies in a liquid form which do not contain ingredients not readily washed away from the organ of taste. Epsom or even Glauber's salts, for examples, may be taken without disgust.

It is perfectly proper to take cognizance of the influence exerted on the minds of patients by the use of remedies. Hence, placebos may be indicated. This indication is not limited to ignorant patients. If it be said that sensible persons ought to be satisfied not to take remedies if the physician thinks they are not required, the answer is, however intelligent and strong minded a person may be in health, he is often otherwise when sick. They who have had ample experience in treating patients in all classes of society, are aware of the fact that persons of the strongest intellect are childish in disease. What Shakespeare said of imperial Cæsar in Spain, is true to nature. Moreover, erroneous ideas of disease and medication are often enough held by those who are learned in other departments of knowledge. To prescribe, however, placebos which are absolutely inert, is, to say the least, undignified. It is a deception, which, excepting when it enters into scientific observations, compromises self-respect. Nor is it necessary. There are always minor indications to be fulfilled by remedies which incidentally secure the mental influence it is deemed important to exert.

A good plan frequently in treating cases of chronic and sometimes of acute disease is to intermit for a brief period all active medication in order to observe the condition of the patient when withdrawn from the influence of remedies. In this way the physician is aided in determining the actual effects of the treatment which has been employed, and in judging of indications for resuming medication.

In treating cases with reference to syptomatic indications, the remote effects of the treatment must be considered. Bloodletting, for example, will relieve promptly acute pain in the early stage of pneumonia, although in view of other circumstances, and regarding its ulterior effects, it be contraindicated. A dyspeptic patient may derive an immediate advantage by restrictions in diet; but if these be carried so far that the system fails to receive adequate alimentary supplies, common sense teaches that the body must deteriorate in nutrition and strength.

The different modes of dying, in cases of acute disease endangering life, are to be considered with reference to measures of treatment. Of the two modes of dying, namely, apnœa and asthenia, the latter is frequently the exclusive mode; that is, the action of the heart ceases quickly (rapid asthenia), as in syncope from profuse hemorrhage, and paralysis from distension, or gradually (slow asthenia) from progressive failure of the vital powers. It is, on the other hand, rare for the mode of dying to be exclusively by apnœa. Instances are, death from œdema of the glottis and pulmonary œdema. If death occur suddenly or quickly (rapid apnœa), it may be purely from apnœa; but if gradual (slow apnœa) the two modes are combined. Now, at the bedside, these questions may have an important bearing on the treatmemt: Is the danger in the direction of apnœa or asthenia; and in either direction, is the danger immediate or more or less remote? Bloodletting, for example, may be urgently indicated when symptoms denote rapid apnœa, on account of its prompt efficiency, and, if not urgently indicated, it may be admissible if slow apnœa be the chief source of danger, whereas, in diseases tending to death by asthenia, this or any remedy which impairs the vital powers may favor an asthenic tendency and therefore prove injurious.

The practitioner has to deal with idiosyncrasies, real or fancied, as regards the effects of remedies. There are real idiosyncrasies which are to be heeded. Quinia, for example, is sometimes not well tolerated, although the intolerance is often imaginary. The iodide of potassium affects some persons unpleasantly, and occasionally produces violent toxical symptoms. The after effects of opium may be so severe that patients are reluctant to take it. Idiosyncrasies, however, are often fancied. A species of egotism leads many to imagine that they have an unusual susceptibility to drugs. The belief in a peculiarity of constitution in this regard, or in an ability to tolerate enormous doses, is a source of satisfaction. Dealing with fancied idiosyncrasies often calls into requisition the judgment and tact of the practitioner.

Opiates and alcoholics hold an important place in therapeutics. Their employment in cases of chronic disease may lead patients to become addicted to their habitual use. This is a consideration not to be lost sight of in clinical medicine. The danger of so great a calamity enforces the importance of great discretion in employing these therapeutical agents.

The liability to the opium habit has increased since the hypodermic method of administration has come into vogue. The author has known of several instances in which young medical men have been ruined by the formation of this habit. Hypodermic injections should never be performed by patients upon themselves with the sanction of the physician. And the administration of opiates in any mode should not be advised unless the patient remains under medical observation. Timely warning should be given of the danger whenever it is called for. If the habit have been already formed, the importance of instant and complete discontinuance is to be impressed. The most effectual method of cure is to persuade the patient to determine at once to abandon the habit. The plan of leaving it off by degrees requires a perseverance which few are able to maintain, and is therefore not likely to succeed. It is better to encounter the severe distress which attends the sudden interruption of the habit. The physician can do much by encouragement to endure the distress until the system is adjusted to the change. A few weeks generally suffices, and the suffering diminishes much after a few days. The distress is often so great that the firmness of the physician is apt to give way. The plan, however, certainly in the vast majority of cases, is perfectly safe. The earlier it is resorted to, the less the intensity and duration of the suffering, and the greater the prospect of success. If the habit have been long continued, the demoralization is such, and the will becomes so enfeebled, that the prospect of success is small; but the importance is so great, that no effort should be spared to remove it.

It is the duty of the physician to point out to patients the pathological effects of the habitual use of alcoholics beyond physiological limits. Cirrhosis of the liver and other effects are often produced in persons who are not drunkards. A morbid craving for stimulants, which may lead to intemperance, is sometimes incident to affections of the digestive organs, and of the nervous system, ceasing when health is restored. As is well known, some persons are afflicted with a periodical craving for alcoholic excitation, as an idiosyncrasy, and some are so constituted that the slightest indulgence creates an irrepressible desire to drink to intoxication. It is obvious that these persons should never have the authority of medical advice for taking alcoholics, unless it be an acute disease. Physicians are rarely responsible for the intemperate habits of their patients. Without inquiring here into the circumstances leading to these habits, when formed they are to be considered as denoting disease. No one ever deliberately decided to become a drunkard, and no one ever remained a drunkard from deliberate choice. Drunkenness, in a clinical point of view, is a malady, and as such, is to be treated by discontinuing the use of alcoholics, and by employing medicinal and moral means to restore health and fortify the will. Inebriate asylums, if well managed, may accomplish a vast amount of good.

Sources of Error in Therapeutics.

The basis of therapeutics is experience. The requirements for a perfect therapeutical system on this basis are—1st. Complete knowledge of the natural history of diseases. This knowledge is derived from the analytical study of a sufficient number of recorded cases in which the diseases were allowed to pursue their course without any active treatment. Completeness of the knowledge requires that numerous groups of cases of the same disease be studied separately with reference to the influences exerted by age, sex, occupations, habits of life, climate, hereditary predispositions, complications, antecedent diseases, etc. 2d. The results of the analyses of corresponding groups of cases in which different methods of treatment were pursued, and a comparison of these results as regards arrest, cure, duration, palliation, and subsequent health, with the facts acquired respecting the natural history of diseases. It is questionable whether the fulfilment of these requirements be within the range of possibility; but it is to be hoped that the labors in behalf of clinical medicine, during successive generations, will lead progressively toward an exact system of therapeutics based on experience. Not a little has been accomplished within the last half century; and it is fair to attribute in a great measure the changes in medical practice during this period to advancement in knowledge of the natural history of diseases.

In the present state of therapeutics, what is known respecting the treatment of cases of individual diseases will be the important point of inquiry when these come to be considered. As preliminary to their consideration under this aspect, it will be useful to glance at some of the sources of error incident to the imperfections of our existing knowledge.

Want of knowledge of the natural history of many diseases is doubtless a source of error. This is a fair inference from past experience. Diseases which were formerly considered as having an indefinite duration and tending to a fatal termination, if active treatment were not employed, have been shown to be self-limited with an intrinsic tendency to recovery. It cannot be affirmed positively of any case of disease, that the favorable termination or the duration is due to therapeutical agencies, until the course of the disease has been observed in a certain number of cases in which no active measures of treatment were employed. Some diseases abort spontaneously in a certain proportion of cases. This fact is to be taken into account in judging of the efficacy of the so-called abortive measures of treatment. Changes for the better, or for the worse, occurring independently of the treatment, are apt to be imputed to the latter. The favorable ending of a disease from self-limitation may be attributed to the remedy or remedies which immediately preceded convalescence. These errors are expressed in the often quoted aphorism, *post hoc ergo propter hoc*.

A source of error is in reasoning, *a priori*, either from the supposed or established physiological effects of remedies, or from pathological doctrines. This method of reasoning is legitimate, but the correctness of conclusions is to be confirmed by experience. We may distinguish the errors of this class as theoretical. For example, certain remedies either increase or diminish the quantity of blood in the capillary vessels, by causing contraction or dilatation of the smaller arteries from an influence exerted through the vaso-motor nerves. Theoretically, these remedies are employed accordingly as it is deemed desirable to produce these effects in different diseases. It is for clinical experience to determine to what extent these effects are useful in treating cases of disease. It would be easy to cite examples from the past in which therapeutical measures were based on pathological doctrines now obsolete. A strking example was the hepatic pathology which formerly dominated therapeutics in some parts of our country. The liver being regarded as the source of a host of maladies, and as modifying, more or less, most diseases, medical practice consisted largely in remedies supposed to affect the secretion of bile and the circulation in this organ.

Errors originate in fallacious experience. New methods of treating cases of disease are announced, and advocated on the ground of remarkable success. They are adopted by many with avidity, and on trial it is found that their claims to success are without foundation. This is a story familiar enough to those whose professional life has extended over a considerable period. Now it by no means follows that the originators are either ignorant or dishonest. They are led into error by fallacious experience. The methods are devised with a worthy desire to make improvements or discoveries. The first practical applications seem to furnish proof of the success which was anticipated. The mind is then in the attitude of seeking evidence to support a conclusion to which it is already committed. In this attitude, and under the bias of enthusiasm, the interpretation of facts is likely to be in accordance with preformed conclusions, without any deliberate intention either to deceive or to be deceived. Errors from this source are to be guarded against by reserving conclusions until a sufficient number of observations have been made. Making careful records of cases and accepting the results of the analytical study of them constitute a safeguard.

Accepting opinions simply because they emanate from those entitled to respect, accounts for the diffusion of errors, which may be called the errors of authority. The often repeated quotation, *jurare in verba magistri*, expresses a habit vastly less prevalent now than in the past history of medicine, but having still a large influence on therapeutics. Authors and teachers, however distinguished, are certainly not infallible, and should not unduly control individual judgment or supersede personal experience.

An over readiness to adopt novelties in practice leads to errors which may be distinguished as the errors of credulity. There are those who are ready at once to accord full faith to new remedies or methods of treatment, and, in this country, especially if they have been imported from abroad. Some physicians are never discouraged in adopting novelties, the claims of the latest being always promptly acknowledged. These physicians have an overweening confidence in the resources of therapeutics. They are in strong contrast to those who, either from indolence or obstinacy, become confirmed routinists in medical practice. The latter are monumental physicians representing in their practice, not the progress of medicine, but the past. In common parlance they are known as "old fogies."

Errors arising from a lack of faith in therapeutical resources may be distinguished as the errors of skepticism. Here, as elsewhere, the safest course lies between extremes. *Inter media tutissimus ibis.* Without discussing the question whether more harm results from too little than too great confidence in active treatment, it is certain that a physician who is hopelessly distrustful of all curative agencies, had better have chosen some other calling than the practice of medicine. The wise practitioner is the servant, not the master of Nature; but he is an unprofitable servant who is content to be always an inactive spectator of disease. A just appreciation of the powers of Nature and of the resources of therapeutics will secure against the errors, on the one hand, of credulity, and, on the other hand, of skepticism.

The Expectant System in Treating Cases of Disease.

Expectation, expectant medicine, and the expectant system, are terms much used in medical conversation and literature. They are not always used in the same sense, and hence it is important to state the meaning to be understood when they occur in the pages which are to follow. As it seems to the author, these terms should not be considered to mean that the treatment during the whole course of a disease is to be restricted to hygienic measures, in other words, that they imply the withholding of all active therapeutic measures. They signify waiting for the indications which call for activity of treatment. Such indications may or may not be present during the course of different diseases. They may be present at some periods and wanting at other periods during the course of a disease. They may be present in some and not in other cases of the same disease. In meeting indications, the expectant physician ceases to be merely an observer, and employs measures which may be among the most potential in therapeutics. As an illustration, in the essential fevers the expectant system is followed when the physician waits for a certain amount of increased body-heat, and then resorts to the cold bath or large doses of quinia to diminish the hyperpyrexia. With this understanding of the meaning of the term, expectation does not signify nihilism or a "do nothing" treatment. It is a system opposite to a routine practice, and that which resorts to perturbatory agents not having reference to definite objects. As thus defined, the system is applicable to the treatment of a large proportion of the cases of disease.

The Professional Conduct of Physicians.

It is not intended under this heading to touch upon any matter which belongs to either medical ethics or etiquette, nor upon any topic pertaining to the morals of the profession. To do either would be to go without the scope of this work. Certain rules of conduct will be mentioned, relating chiefly to the professional intercourse between physicians and patients.

Cheerfulness of mien is an important element in clinical medicine. It is not merely a politic accomplishment, but a professional duty. Its moral influence upon patients entitles it to rank among the measures of treatment. In its cultivation, hilarity and frivolity are to be avoided. The latter, in the intercourse between the physician and patient, are unprofessional.

It is a duty to manifest a proper degree of interest and sympathy in cases of disease. This not only wins the confidence and attachment of patients, but an influence is thereby secured which, judiciously managed, may be made useful in the treatment. Discrimination in this regard among patients according to their station in life and the ability to remunerate for medical services, brings justly a reproach on the character of the profession. Manifestations of indifference or harshness toward patients in charitable institutions deserve to be stigmatized as brutal. These patients have claims of poverty added to those arising from their diseases. Moreover, inasmuch as they are involuntary patients, that is, having no voice in selecting and retaining those to whom they look for relief, inhumanity toward them is taking an ignoble advantage. Brutality is less reprehensible when manifested toward those whose influence is valuable, from whom fees are expected, and who can terminate at any moment professional relations with their medical advisers.

Patients are entitled to all the encouragement which can conscientiously be given. In this point of view, there is a marked contrast in the conduct of different physicians. Some who are unfortunately disposed to look upon the darkest side, anticipating the most unfavorable events which can happen, communicate their apprehensions and gloomy forebodings either by words or manner. The discouraging influence on the minds of patients is often baneful. It is a duty to give the encouraging points in any case, and it is a duty not to discourage by presenting prospective dangers which are problematical. Cases which furnish an exception to the latter rule are those in which it may be necessary to alarm the patient in order to secure measures of protection against events which are liable to occur. For example, the effect of phthisis on the mind is such that sometimes patients insist upon the inutility of taking any steps to prevent the further progress of the disease. As a rule, whenever there is doubt as to the degree of existing danger, patients should have the benefit of the doubt in the way of encouragement.

In cases of disease threatening life, shall this fact be voluntarily communicated to patients in order to give time for the disposition of worldly affairs and other preparations for death? With reference to this question, the physician is often placed in a delicate and somewhat difficult position. It is rare for patients with mental faculties intact to ask, of their own accord, a direct question as to immediate danger. If asked, the physician is bound to answer without deception, but, if possible, with qualifications which will not take away all hope. If not asked, it may be the duty of the physician to suggest that some friend of the patient communicate the fact of imminent danger. Patients after becoming aware of danger, and having made, in view thereof, every preparation, are sometimes more tranquil than before. Resignation at the near approach of death is the rule; fear and dread of the termination of life, when encouragement can no longer be given, are rare exceptions to the rule. This does not militate against the beneficial influence of encouragement so long as it can be given. In brief, knowledge of the character of the patient, and of all the circumstances in individual cases, in connection with the exercise of judgment and tact, must determine the conduct of the physician when diseases approach a fatal termination. It may be added that the visits of judicious clergymen are unobjectionable either in the cases now referred to, or when life is not immediately threatened.

Physicians are most apt to be asked respecting danger when patients either imagine its existence or suppose that it does not exist. The usual mode of asking, is not, "tell me candidly if I am in danger," or "what are the chances of my recovery," but, "you do not think my case serious," or "you have no doubts of my recovery." Most patients who infer from circumstances that they are considered to be in great danger, prefer not to be told so in plain terms. If there be danger, not proximate, but more or less remote, the answer to the foregoing questions should be such as to avoid deception, to secure any needed preparations, and, at the same time, not to withhold a proper degree of encouragement. "It is better to be prepared and not go, than to go unprepared," was the happy reply of a medical friend of the author to a patient who inquired whether his condition was sufficiently serious for a final disposition of affairs.

Intimations to patients of a liability to sudden death should be made with the greatest reserve. The cases are rare in which the physician is able to foresee this event with anything like certainty, and it is a cruel act to intimate the liability on insufficient ground. The author has known repeated instances of wretchedness for years caused by the belief that apoplexy might be expected at any time, and that death might occur at any moment in cases of purely functional disorder of the heart. Even in cases in which a liability can be recognized, as in cases of angina pectoris, fatty heart, and certain aortic lesions, the event may not occur for a long period, if the patient do not die with some intercurrent affection. In these cases, the physician should inform some discreet friend of the patient of the recognized liability to sudden death. It is well, also, to make memoranda, which may be referred to after sudden death has occurred, as a protection against the charge of either negligence or ignorance.

Communications in respect to danger, may often be made to relatives or intimate friends with less reserve than to patients. They are, however, to be made with discretion. If extremely discouraging they are apt to be interpreted as taking away all hope. The patient is considered as "given up." The effect is demoralizing. Either further efforts are abandoned, or doubts arise concerning the propriety of the practice pursued, both telling against the welfare of the patient. The physician should bear in mind, that in certain cases he may overestimate the danger, and that instances are not very infrequent of recovery when the condition seemed as hopeless as possible. All physicians of much experience can cite cases illustrative of this fact.

Undertaking to predict that a patient will live a certain nnmber of days, weeks, months, or years, is injudicious to say the least. It is a hazardous undertaking as regards the sagacity of the physician, and it may occasion mischief. Giving the percentage of the chances of death or recovery, is also objectionable. It does not confer credit on the profession for healthy persons to be able to say that in years past they were pronounced incurable and the time of death specified.

It should be a rule of professional conduct not to communicate information concerning the maladies of patients, except to those entitled to receive it. Patients have a right to the privacy of their diseases, albeit it is but little respected by individuals or the public. The question so often addressed to physicians, What is the matter with this or that patient? is asked in innocence of its impropriety, and therefore does not challenge rebuke; but pains should be taken to have it generally understood, that such a question is improper, and that the physician is not at liberty to answer it, unless authorized by the patient.

Certain rules relating to professional visits may be mentioned. The frequency of visits, aside from the wishes of patients and friends, is to be regulated by the importance of observing variations of symptoms, or the effects of treatment, and of this, of course, the physician is the best judge. The liability to err in the number of visits is in making too few rather than too many, for the reason that physicians are generally sensitive in regard to an imputation of making more than are required. This sensitiveness, carried to an excess, not infrequently is of damage to the physician, patients inferring lack of interest or attention. Too short intervals between visits are sometimes objectionable, leading to injudicious changes in treatment. In general, it is not advisable to remain constantly with patients unless for the purpose of carrying out measures of treatment which require continued supervision. Regular visits should not be so brief that full attention cannot be given to the case, and the physician should not appear to be hurried. The patient is apt to be left in an uncomfortable frame of mind if there be occasion to think that the case has not been well considered. On the other hand, visits should not be too prolonged. After examining, prescribing, and giving full directions, the sooner the physician takes his departure the better, if there be no special reasons for delay. During a professional visit, the first and chief topics of conversation should have reference to the case. It is a great mistake to act as if the latter were of secondary consideration, the greater part of the time being devoted to extraneous matters. Physicians sometimes fall into the error of occupying the time with a recital of other cases, and telling of matters which exclusively concern themselves. These rules of conduct are important with reference to professional success as well as to the welfare of patients.

The manners and appearance of the practitioner of medicine are by no means of so little moment as to be unworthy of being alluded to in connection with clinical medicine. In no profession or calling are coarseness, vulgarity, untidiness, and repulsive habits more incongruous than in medical practice. These comprehensive terms will suffice without going into details. The physician should be ready to overlook the waywardness, ill humor, and prejudices of those to whom he is called to minister in disease. He should not be over-sensitive as regards personal dignity, and, as far as possible, he should refrain from exhibitions of irritability of temper. Sickness claims forbearance and charity. Still, there are limits to endurance and encroachments on self-respect. If a patient whose intellect is unaffected by disease refuse to follow the treatment which the practitioner decides to pursue, he should at once decline any further responsibility in the case ; and if there be other manifestations of want of confidence the case should be relinquished.

SECTION FIRST.

DISEASES OF THE RESPIRATORY SYSTEM.

PRELIMINARY OBSERVATIONS.

SYMPTOMATOLOGY.—Symptoms relating to cough, expectoration, respiration, pain, and the voice.

PHYSICAL SIGNS.—Percussion: flatness, dulness, tympanitic, vesiculo-tympanitic, cracked metal and amphoric resonance—Auscultation: diminished, suppressed, and increased murmur of respiration—Shortened inspiratory and prolonged expiratory sound—Bronchial and broncho-vesicular respiration—Bronchophony, whispering bronchophony, and increased vocal resonance—Cavernous respiration—Pectoriloquy—Broncho-cavernous respiration—Amphoric respiration, voice, and whisper—Adventitious sounds or râles: moist bronchial, or bubbling and subcrepitant—Dry bronchial râles: sibilant and sonorous—Crepitant râle—Cavernous râle—Pleuritic friction râle—Inspection—Palpation—Increased, diminished, and suppressed vocal fremitus—Mensuration—Succussion—Laryngoscopy.

TOPICS claiming attention before entering upon the diagnosis and treatment of the diseases affecting the respiratory system are embraced under two heads, namely, Symptomatology and Physical Signs, the latter including the appearances observed by means of the laryngoscope.

SYMPTOMATOLOGY.

The local symptoms which enter into the clinical history of the diseases affecting the respiratory system relate to cough, expectoration, respiration, pain, and the voice.

Cough.

There are numerous varieties of cough, some of which have considerable diagnostic significance.

Cough is dry when it gives no audible evidence of liquid in the air passages. It is moist when the sound denotes the presence of liquid. It is loose when expectorated matter is more or less abundant. The acts of coughing may be involuntary, that is, due to reflex influence, or voluntary, that is, due to the will, and not infrequently they are partly volitional and, in part, automatic. In infants and young children coughing is, for the most part, involuntary.

A short, dry cough, often called a hacking cough, is a frequent symptom in the incipient stage of phthisis. It has much diagnostic importance if it follow hæmoptysis, or if it be associated with increase of the temperature of the body and loss in weight. It is usually a symptom in pleurisy either acute or chronic. It is an occasional symptom in chronic pharyngitis. Elongation of the uvula sometimes occasions it. It is a rare effect of a local irritation situated elsewhere than in the respiratory organs, for example, the irritation caused by worms in the alimentary canal.

Cough is short, dry, and evidently suppressed in the first stage of acute pleurisy. It is called a suppressed cough. The suppression is instinctive, and is caused by the pain attending the acts of coughing. A suppressed cough is also a symptom in cases of pneumonia; also in intercostal neuralgia and pleurodynia. If there be cough in cases of acute pericarditis and peritonitis, it may be suppressed for the same reason. Coughing may frequently be suppressed by a strong effort of the will.

Cough is spasmodic or convulsive when it consists of a series of involuntary expiratory efforts, more or less violent, occurring in rapid succession. A typical cough, of this variety, characterizes pertussis, or whooping-cough. The inspiration succeeding the series of expiratory efforts is accompanied by the whoop, showing spasm of the glottis. The acts of coughing occur in paroxysms, and often occasion vomiting. In a less marked degree, cough is spasmodic in cases of acute and chronic bronchitis.

Violent coughing, not spasmodic or convulsive, is caused by the presence of tenacious sputa in the air passages, and by the delusive sensation of their presence in bronchial inflammation. The latter is analogous to the sensation in dysentery or in cystitis, and may be called bronchial tenesmus; the inflammatory condition occasions a feeling as if something were to be expectorated. Much of the violence of the coughing is often due to volitional efforts, which may be compared to the straining in tenesmus of the rectum or bladder. Much fatigue is sometimes avoided by abstaining from acts of coughing until sputa reach a situation from which they are expectorated with ease.

If the larynx be unaffected, the cough, in proportion to its violence, is sonorous and ringing from the approximation of the vocal cords. Such a cough suffices to exclude laryngeal affections. The cough is hoarse, husky, or stridulous in laryngitis, either acute, subacute, or chronic. A very slight degree of laryngeal inflammation renders the cough hoarse or husky. Ulcerations and thickening of the vocal cords always affect the cough. In laryngitis with false membrane, and in simple acute laryngitis with much submucous infiltration, cough is almost without sound. This has been called an abortive cough.

An abrupt, loud, metallic tone, either high or low in pitch, distinguishes what is known as a croup-cough. The character of this variety is so distinctive that, when once heard, it is easy to recognize it. It characterizes especially the paroxysms of laryngeal spasm, or of so-called false croup, to which children are subject—an affection giving rise to needless alarm in the household from the dread of laryngitis with false membrane, or the so-called true croup. The two affections are pathologically distinct, and the former does not eventuate in the latter. In the early part of laryngitis with false membrane the croup-cough may occur, giving place to the husky, stridulous, or abortive cough. When a symptom of this affection, it is associated with other symptoms showing laryngeal inflammation. This croup-cough also occurs in simple, acute, or subacute laryngitis, that is, without false membrane, in children.

Somewhat analagous to the preceding, is a variety which is known as a nervous cough. This sometimes has a short high-pitched intonation resembling the crowing of a cock, or the cry of some animal; and it is sometimes a low, explosive sound like the barking of a dog. Its unusual character attracts attention and renders it a source of annoyance to the patient and to others. It occurs almost exclusively in young girls, and from its being frequently associated with manifestations of hysteria it has been called a hysterical cough. From its frequency and persistency it is apt to occasion needless anxiety. It denotes neuropathic disorder, and ceases when the condition of the nervous system is improved. Its purely nervous character is to be determined by exploring the larynx by means of the laryngoscope with a negative result, and by the absence of other symptoms and the signs of pulmonary disease. Co-existing hysterical manifestations corroborate the diagnosis, but these are not uniformly present. This variety of cough has been known to be so generally diffused by imitation through a girls' boarding school that the school was in consequence broken up.[1]

A feeble, hollow, ineffectual cough is characteristic of the advanced stage of phthisis. To this variety is sometimes applied the significant name, sepulchral cough.

Diseases or injuries of the spinal cord, producing incomplete paralysis of the costal muscles, or the diaphragm, or of both, render the cough feeble and ineffectual in proportion to the degree of the paralysis. Death under these circumstances may be caused by an accumulation of bronchial secretions which the patient is unable to expectorate.

Expectoration.

The term expectoration is used to signify the expectorating act, and the matter expectorated. Using it now in the latter sense, there are numerous varieties of expectoration having more or less diagnostic importance.

An expectoration consisting entirely of blood constitutes Hæmoptysis, which it is necessary sometimes to recognize as, not a mere symptom, but an individual affection. The quantity of blood expectorated within a given time varies from a drachm, or even less, to several quarts. The variations in quantity are expressed by such terms as excessive, profuse, moderate, small, and slight hæmoptysis. The rapidity with which the blood is expectorated also varies greatly in different cases. Other variations relate to the duration of the hemorrhage and its recurrence after variable intervals.

---

[1] *Vide* Diseases of the Throat, etc., by J. Solis Cohen, M.D., New York, 1872.

The known conditions in connection with which hæmoptysis occurs, are especially those incident to phthisis. Before pulmonary cavities have been formed in this disease, the hemorrhage is from the bronchial mucous membrane (Bronchorrhagia). In the cavernous stage it may be from the interior of the cavities. As a symptom of phthisis hæmoptysis has much diagnostic value. It occurs much oftener in an early period in the disease than when it has considerably progressed, so that it is valuable as a diagnostic symptom at a time when it is not always easy to diagnosticate the disease by other symptoms, nor by physical signs. It not infrequently precedes other pulmonary symptoms, and sometimes even appreciable signs. So frequently is its occurrence in phthisis, and so infrequent, comparatively, in other diseases, that whenever preceded or accompanied by cough, it is presumptive evidence that either the patient is, or is likely to become, phthisical.

Hæmoptysis is a symptom in cases of hemorrhagic infarctus and pulmonary apoplexy, in stenosis of the mitral orifice of the heart, in some cases of dilatation of the bronchial tubes, and in emphysema. In these affections, with the exception of pulmonary apoplexy, it is usually small. Bronchial hemorrhage may be vicarious with menstruation, although instances are rare. It may occur in cases of purpura, scorbutus, and yellow fever. The hemorrhage may proceed from the bursting of an aneurism into the trachea or one of the primary bronchi. It is an occasional event in pregnancy, and when no other symptoms of pulmonary disease are present. Irrespective of the latter condition, it may occur without any appreciable pathological associations. In these cases the bronchorrhagia must be reckoned as in itself an affection. It may be neither a symptom of any disease which can be recognized, nor a premonition of any diseases. Such cases, however, are rare.[1]

Blood is usually expectorated by slight efforts of coughing. It flows upward into the trachea, and is easily expelled. To determine that it comes from the air-passages is important. Hemorrhage from the posterior nares, throat, mouth, and the stomach, is to be distinguished from hæmoptysis. It is extremely rare for blood to come from the posterior nares without appearing at the nostrils; that is without epistaxis. Inspection of the throat and mouth will discover its source in these situations. The only real difficulty is in deciding between hæmoptysis and hæmatemesis. This is rarely difficult if the blood be seen. In hæmatemesis it is ejected by acts of vomiting; the color is usually dark or black; it has a sour odor, and it does not contain air bubbles. Blood from the air-passages has usually a bright color. It acquires, however, a dark color if it remain for sometime in the air passages before being expectorated. It is usually spumous or frothy; an exception to this statement is when it is expelled very rapidly. If the patient be seen while the hemorrhage is going on, it is easy to determine whether the blood is expelled by acts of coughing or vomiting.

---

[1] For an account of some cases in which slight hæmoptysis recurring daily, or at short intervals, for a long period, and not referable to any pathological condition, *vide* work on Phthisis by the author, 1876, page 86.

There are several varieties of expectoration containing blood, but not exclusively hemorrhagic. One is the rusty expectoration which is pathognomonic of acute pneumonia. This expectoration is semitransparent, and adhesive, the rusty color being due to the intimate admixture of a little blood. Owing to its viscidity, a considerable quantity will remain at the bottom of the vessel when inverted. The rusty expectoration is not to be confounded with that to which the name prune-juice has been applied. The prune-juice expectoration contains blood in larger quantity, intimately mixed. The sputa are less viscid. This occurs in pneumonia, and usually at a later period than the rusty expectoration.

An expectoration presenting bloody streaks is characteristic of bronchitis in its first stage. The streaks are caused by sputa passing over points where a few drops of blood had escaped. The blood is sometimes in points or dots instead of streaks.

After hæmoptysis has ceased, the sputa frequently, for some hours or days, are more or less bloody, that is, they contain blood mixed in variable proportions. The blood has a dark color.

An intimate admixture of blood with sputa of a jelly-like consistence occurs in some cases of carcinoma of lung. This has been called the currant-jelly expectoration.

The sputa in some cases of pneumonia are yellow and sometimes greenish. These appearances were formerly attributed to bile. They are caused by hæmatine which, in combination with mucus, may undergo these changes in color. When, in addition, sputa are semitransparent and viscid, they are as characteristic of the first stage of pneumonia as the ordinary brick-dust coloration. Bile in the expectoration has been discovered by chemical reagents in pneumonia associated with intense jaundice, but its presence is exceptional. It may be present together with particles of the parenchyma of the liver in cases of hepatic abscess evacuating through the bronchial tubes, and also when hydatids of this organ take that direction.

The varieties of expectoration most frequently met with are the mucous, the purulent, and the muco-purulent. The expectoration is mucous when its characters approximate to those of normal mucus. It is transparent, viscid, and stringy. It has these characters in the first stage of bronchitis and laryngo-tracheitis. In the second stage it is more abundant, becomes opaque, and is less adhesive; hence it is expectorated with greater facility. These changes are chiefly due to the presence of leucocytes or pus in larger proportion. The expectoration is now muco-purulent. The characters vary according to the variable relative proportions of mucus and pus. The preponderance of pus renders it more opaque, less viscid, and less easily drawn into threads. After the first stage of bronchitis or laryngo-tracheitis, and in the chronic form of these affections, the expectoration consists of muco-pus, the characters differing as either mucus or pus predominates.

A muco-purulent expectoration is said to be nummular when the sputa are flattened and round, resembling a piece of money. Sputa presenting this appearance have been considered as characteristic of phthisis. They are not, however, pathognomonic of that disease.

The expectoration is purulent when it consists chiefly or entirely of pus. The gross characters which distinguish it from an expectoration in which mucus predominates are marked. It is opaque, and either of a white, greenish, or yellowish color. It is devoid of air bubbles which are present in a mucous expectoration, and therefore it sinks in water—a criterion of pus, as distinguished from mucus, which dates from Hippocrates. Collected in a vessel in considerable quantity, it forms a diffluent mass, the sputa not remaining distinct. An expectoration in which the characters of pus greatly predominate, occurs in some cases of chronic bronchitis. It presents the characters of pure pus in cases of abscess of the lung, of empyema in which perforation of the pleura has taken place, and when purulent collections of the liver, kidneys, spleen, or in other situations are evacuated through the bronchial tubes. Whenever pus is expectorated suddenly in considerable quantity, it is derived from some one of these sources.

A serous expectoration is a thin liquid, more or less abundant, and devoid of the appearances derived from either pus or mucus. Mucus is never entirely wanting, and the microscope would always show leucocytes, these constituents, however, not being present in sufficient quantity for their distinctive gross characters. If there be sufficient mucus to render the liquid ropy, the serosity greatly predominating, it may be distinguished as a muco-serous expectoration; and if pus be present sufficiently to cause opacity, it may be called sero-purulent. A serous expectoration is expressed by the term bronchorrhœa. The liquid is a transudation into the bronchial tubes. When collected in a vessel, it has a foamy appearance, and is sometimes sanguinolent. This expectoration is a marked symptom in some cases of œdema of the lungs, occurring in this connection without bronchitis. It characterizes certain cases of bronchitis associated with obstructive lesions at the mitral orifice of the heart. It occurs when, aside from bronchitis, no special causation is apparent.

An expectoration is fibrinous when it contains either exuded fibrin in the form of false membrane, or the coagulated fibrin of extravasated blood. The latter is of rare occurrence.

False membrane formed in the larynx and trachea is expectorated in patches varying in size and shape. These are characteristic of exudative laryngitis, or true croup, either occurring as a distinct affection or as a complication of diphtheria. They are expectorated if the disease do not destroy life before their separation from the mucous membrane takes place. If the exudation in the affections just named extend into the bronchial tubes, it may be expectorated either in small patches or in cylindrical forms corresponding to the calibre of the tubes from which they are detached.

Cylindrical casts of the bronchial tubes are expectorated in the rare variety of bronchial inflammation known as fibrinous bronchitis, the exudation being limited to the bronchi. Remarkable specimens are sometimes obtained which represent a bronchus of the third or fourth order, and with which are connected branching cylinders representing the successive branches of the bronchial tree, even to those proximate to the capillary tubes. The author has met with a case from which a great number of these specimens were obtained at different periods. The larger of these casts are sometimes hollow, resembling macaroni, and those of small size may be compared to vermicelli.

Fibrinous casts of bronchial tubes are also formed by coagulation of the fibrin of extravasated blood. These are preceded by hæmoptysis, of which they are rare sequels. The author has a specimen of this kind in which successive divisions of the bronchi are represented as in cases of fibrinous bronchitis. In a specimen recently presented at a meeting of the New York Pathological Society, the patient having died from profuse bronchial hemorrhage, the greater part of the bronchial tubes of one lung were filled with coagulated fibrin.

The casts of the bronchial tubes, whether from the exudation or coagulation of fibrin, are expectorated in solid masses. These being placed in water, the branches may be carefully detached and displayed. Without this mode of examination they would escape discovery.

The expectoration, aside from its general characters, may contain matters which have diagnostic significance. Some of these are determinable only by microscopical examination. As regards the varieties already noticed, the gross appearances suffice for their discrimination.

Calcareous concretions may be contained in mucous or muco-purulent sputa, or they are expectorated by themselves. They vary in size from that of a pin's head to a pea, and are either round or irregular in shape. They correspond to calculi found in the lung tissue or in pulmonary cavities after death. A large number are sometimes expectorated. Their relations to tubercles have been much discussed. They occur in phthisical subjects oftener than in others; but it is questionable whether they are always to be considered as evidence that tubercles have existed. They have been considered as tubercles which have undergone calcification, in this way becoming obsolete; and this is perhaps the most rational supposition. They are to be distinguished from the concretions which not infrequently are found in the follicles of the tonsils. These are sometimes expelled by acts of coughing, and are liable to be mistaken for pulmonary calculi. They differ from the latter in being unctuous to the touch, crushing, instead of crumbling, under pressure, and generally when crushed emitting an offensive odor. Moreover, an inspection of the fauces will usually show similar masses remaining in the follicles.

The sputa in cases of chronic laryngitis may contain fragments of cartilage, showing deep-seated ulceration and necrosis. These are to be distinguished from calcareous concretions by the characters of cartilaginous structure determinable by means of the microscope.

A microscopical examination of purulent or muco-purulent sputa in cases of phthisis may reveal the presence of elastic fibres from the lung tissue. This is evidence of destruction of pulmonary substance in the progress of this disease, and it may be available before the physical signs of cavities are determinable. The presence of these fibres, in an expectoration which is suggestive of pulmonary gangrene, is evidence of this affection, and that it is not limited to the mucous membrane but involves the parenchyma.

By means of the microscope, the sacs of hydatid productions, and the characteristic scolices or hooks may be discovered in the expectoration. Their presence is proof positive of the diagnosis. The hydatids may have developed within the lungs or, having been formed in the liver or kidneys, they have made their way by perforation into the bronchial tubes. If formed in the liver, bile, and if in the kidneys, urine may be present in the expectoration.

A gelatinous bloody expectoration, resembling currant jelly, has been mentioned as somewhat diagnostic of carcinoma of lung. The histological elements of cancer have been found by microscopical examination, but their presence is exceptional. Their absence is not evidence against the existence of cancer.

A mucous or a muco-purulent expectoration is sometimes dark or even black. It may have transiently this coloration after breathing an atmosphere loaded with carbon even for a short time. The microscope shows particles of carbon in the sputa. Workers in mines, and those who follow other occupations which involve the inhalation of various substances in fine particles, are liable to a variety of interstitial pneumonia (anthracosis) characterized by notable pigmentation. In some of these cases the sputa, from time to time, have a dark or black color.

In most cases of disease the expectoration is devoid of any distinctive odor. In pulmonary gangrene, however, the odor is an essential element in the diagnosis. An intense and characteristic fetor is caused by the presence in the expectoration of the decomposed pulmonary tissue. The expired breath has the same fetor. The expectoration, in connection with this fetor, may present, wholly or in part, a dark dirty appearance which is suggestive of sphacelated matter, and microscopical examination may show the debris of pulmonary tissue. Without these evidences of gangrene, the expectoration may have a gangrenous odor which denotes superficial sphacelation of the mucous membrane.

Notable fetor sometimes occurs in bronchitis, especially in connection with dilated bronchial tubes, which has been attributed to the presence of butyric acid. The author has known of an instance in which a perityphlitic abscess evacuated through the bronchial tubes giving rise to an intolerable fecal odor.

Dr. M. M. Campbell, of Ohio, has communicated to the author an account of a case in which a considerable number of the parasite known as Pentastoma Constrictum were expectorated. The account was accompanied by a specimen. They retained their vitality, crawling about actively for some time after having been expectorated.[1]

Finally, the appearance in the expectoration of food more or less digested, is evidence of a communication by perforation between the trachea and the œsophagus.

Respiration.

The symptoms referable to respiration embrace abnormal deviations in number, disturbances of rhythm, and difficulty arising from obstruction. Symptoms referable to respiration do not always denote disease of the respiratory system. Morbid conditions relating to the circulation and the nervous system are represented by increased and diminished number of the acts of respiration, and by rhythmical irregularities.

---

[1] For a description of this parasite, *vide* Aitkins's Science and Practice of Med., vol. i.

The respirations are increased in frequency in proportion as the action of the heart is abnormally frequent. This is observed when the circulation is excited by muscular exercise or mental emotions, and whenever there is febrile movement. As a rule, when there is an increase in the number of respirations, irrespective of disease of the respiratory system, the normal relation to the heart's action is preserved, that is, there are four heart-beats, or arterial pulsations, to one respiratory act. Any considerable deviation is evidence of disease affecting either the heart or the respiratory system. There are, however, exceptions to this rule. Thus, the respirations are sometimes very frequent in hysteria, while the action of the heart remains normal. Of course, in determining that the respirations are abnormally either increased or diminished, the normal variations in number are to be considered. A large collection of observations in which the number of respirations were noted, show the range in health to be from 16 to 24 per minute.[1]

In the diseases of the respiratory system which interfere with hæmatosis, the respirations are more or less increased in frequency, provided there be no obstruction of the air-passages. Pneumonia, phthisis, pleurisy with effusion, hydrothorax, and pulmonary œdema are examples of diseases which interfere with hæmatosis. The frequency of respirations, however, is not always in proportion to the amount of interference. The interference occasions a greater frequency when it takes place rapidly than when it is gradual. The frequency also will depend upon the action of the heart, and on the quietude of the patient as regards muscular exertions. Obstruction to the free passage of air through the larynx or trachea prevents increased frequency of the respirations, although there be much interference with hæmatosis. When obstruction is seated in the small bronchial tubes in both lungs, there is a marked difference according to the nature of the obstruction. If due to inflammation (capillary bronchitis) the respirations are notably increased in frequency; but if due to bronchial spasm (asthma) the number of respirations are not more, and may be less, than in health. Bronchitis seated in the large bronchial tubes, unless there be an accumulation of morbid products, does not interfere with hæmatosis, and therefore does not affect the frequency of respirations.

Restriction of the respiratory movements causes a compensatory increase of the frequency of respirations. Thus, the respirations are frequent when the movements of the diaphragm are restrained by abdominal pain and distension in peritonitis, by hydroperitoneum, tympanites, pregnancy, enlarged liver, and abdominal tumors; so, also, when the costal movements are restrained by pain or paralysis of the muscles.

If the respirations be much increased in frequency, and the mental perceptions be not blunted, there is a painful sense of the want of air, or dyspnœa. If this be intense, preventing the patient from keeping the recumbent posture, it constitutes orthopnœa. A moderate increase in the number of respirations may not be accompanied by dyspnœa. The number may be imperceptibly increased to a certain extent, and the patient not be conscious of breathing more frequently than in health.

---

[1] *Vide* Flint's Text-book of Physiology, page 132.

The number of respirations may be less than normal when there are mechanical obstacles to the passage of air through the air passages, as in acute laryngitis, with, or without exudation, tracheal stenosis, foreign bodies in the larynx or trachea, and spasm of the glottis. As already stated, the number may be diminished in spasmodic obstruction in the small bronchial tubes, but not if the obstruction be from bronchitis in this situation. Obstruction of a primary bronchus does not diminish, but increases the frequency of respirations.

Exclusive of the affections which occasion obstruction, diminished frequency of the respirations proceeds from morbid conditions seated elsewhere than in the respiratory system. It is a symptom of certain cerebral affections, and of narcosis especially when induced by opium.

Disturbances of rhythm relate to the relative duration of the inspiration and expiration, and to the succession of the respiratory acts.

The inspiration is shortened in œdema of the glottis by an arrest of the current of air from closure by the œdematous tumors above the vocal cords before the respiratory act is completed; an obstruction limited to inspiration is thus a symptom of that affection. It is shortened and quickened in pulmonary emphysema for another reason, namely, a sense of the want of fresh supplies of air. A shortened and quickened inspiration is also a symptom of cerebral disturbance, and sometimes precedes the occurrence of coma in the essential fevers. It is a symptom of functional disorder of the nervous system in some cases of hysteria.

The expiration is prolonged in cases of asthma and emphysema, the patient instinctively making efforts to expel air from the over-distended pulmonary vesicles.

Irregularities in the succession of the respiratory acts are not diagnostic of diseases affecting the respiratory system.

They are symptoms of cerebral affections and are among the numerous and varied manifestations of hysteria. A remarkable rhythmical disorder coming under this head is that known as the Cheyne-Stokes respiration, so called because each of these observers described it. Stokes describes it as follows: "It consists in the occurrence of a series of inspirations, increasing to a maximum, and then declining in force and length, until a state of apparent apnœa is established. In this condition the patient may remain for such a length of time as to make his attendants believe that he is dead, when a low inspiration, followed by one more decided, marks the commencement of a new ascending and then descending series of inspirations." The author can testify to the accuracy of this description from examples which have fallen under his observation. Stokes regarded it as a diagnostic symptom of fatty degeneration of the heart. It is not however, limited to that affection. It occurs in some cases of uræmia.

Pain.

Certain of the diseases affecting the respiratory system are unattended by pain in the chest. This is true of capillary bronchitis, asthma, emphysema, hydrothorax, and œdema of the lungs. On the other hand, pain is usually a prominent symptom in acute pleurisy. The pain which belongs to pleuritic inflammation is sharp, lancinating, unilateral, and felt especially during inspiration. It is popularly known as a stitch-pain. The pain in acute pneumonia has the same character, and is due to associated pleurisy. If there be no pleuritic complication, pain may be wanting. Exceptionally, even acute pleurisy is devoid of pain. Chronic pleurisy is not infrequently painless. Acute tuberculosis and phthisis are without notable pain except when pleurisy coexists.

Sharp, lancinating, unilateral pain, felt especially in inspiration, is not limited to cases of pleurisy. It is a symptom in cases of intercostal neuralgia and pleurodynia. The conclusion, therefore, that either acute pleurisy or pneumonia exists, cannot be based solely on the pain. These affections are to be differentiated from intercostal neuralgia and pleurodynia, by associated symptoms and by signs; and, in like manner, pleurisy and pneumonia are to be differentiated from each other.

Pain is a symptom in the first stage of acute bronchitis. It is rarely severe, and is felt chiefly in acts of coughing. It has not the lancinating character of the pain in pleurisy, pneumonia, intercostal neuralgia, and pleurodynia, but is a dull, contusive pain. It is not unilateral, and is referred chiefly to the sternal region.

Sharp, darting pains occur in cancer within the chest as well as when it is situated elsewhere. These pains may be distinguished from the pleuritic stitch-pain by their occurring independently of the acts of respiration, and, also, by their being bilateral, owing to the fact that both lungs are usually affected in cases of cancer. Moreover, the pain in pleurisy and pneumonia is associated with symptoms denoting an acute inflammatory disease, whereas cancer is a chronic affection.

Patients who have violent cough often complain of pain with soreness at the base of the chest, caused by the traction upon the ribs of the diaphragm in the acts of coughing.

The neuralgic pain which is characteristic of angina pectoris, and the localized, dull boring pain incident to the pressure of an aneurismal tumor upon the chest wall, are to be discriminated from the pain which is symptomatic of disease affecting the respiratory system.

Voice.

Symptoms referable to the voice are chiefly important in the diagnosis of diseases affecting the larynx.

Laryngeal inflammation, however slight, affects the voice, rendering it either hoarse or husky. Acute inflammation generally extinguishes the voice, that is, reduces it to a whisper. This is the meaning of the term aphonia. The term dysphonia denotes difficulty in phonation, the character of the voice being more or less changed.

Chronic laryngitis occasions either aphonia or dysphonia. Lesions within the larynx—ulceration, thickening, and morbid growths—if they involve the vocal cords, always affect the voice to a greater or less extent, causing hoarseness or huskiness, if they do not occasion aphonia.

It follows from the foregoing facts that acute, subacute, and chronic laryngitis, together with, in most cases, the lesions just named, may be excluded if the voice be unaffected. This statement does not include œdema of the glottis. The œdema being above the vocal cords, if it be without laryngitis, as is sometimes the case, the voice may be unchanged. It is to be borne in mind, that in young children, the cry is synonymous with the voice. The unchanged character of the cry warrants the exclusion of all the affections which may be excluded by the fact of the voice being unaffected.

Aphonia occurs independently of any inflammatory or structural affection of the larynx, namely, from paralysis of the muscles concerned in phonation. It will be included among the individual affections to be considered with reference to diagnosis and treatment; but some distinctive features may be here noticed. The patient makes no apparent effort when requested to attempt to speak. There is no more manifestation of the act of volition than when the will is brought to bear upon any voluntary muscles completely paralyzed. The whisper is not husky as in aphonia from inflammation or lesions; it is a pure, soft whisper. From these features it is generally easy to conclude that the aphonia is not symptomatic of laryngitis or structural changes within the larynx.

Loss of the voice may be simulated and imagined. Some remarkable illustrations will be given in connection with the diagnosis of aphonia considered as a functional affection.

Aphonia may arise from inability to propel the expired current of air with sufficient force for phonation. This is rarely, if ever, a result of pulmonary disease. It may proceed from paralysis of the respiratory muscles. In a case of multiple cerebro-spinal sclerosis, which was under the author's observation for more than a year, there was not only aphonia, but the whispered speech, from impaired expiratory power, was so feeble as to be heard with great difficulty, even when the ear was in close proximity to the mouth of the patient.

When the frequency of the respirations is greatly increased, the patient is unable to sustain expiration long enough to speak more than a few words continuously; the speech is interrupted by the need of fresh inspirations.

Aphonia is to be distinguished from mutism incident to deafness, either congenital or occurring in infancy. It is also to be distinguished from aphasia. The distinction from the latter may be expressed by saying that aphonia is the loss of voice, and aphasia the loss of speech.

PHYSICAL SIGNS.

The physical signs of diseases affecting the respiratory system are obtained by the following methods of examination: Percussion, Auscultation, Inspection, Palpation, Mensuration, and Succussion. Of these methods, percussion and auscultation are by far the most important, but the others are by no means unimportant. The signs furnished by all will be here noticed, their distinctive characters being stated, together with the morbid physical conditions which they severally represent. For details respecting the employment of these methods, and a fuller consideration of the signs, the reader is referred to works treating specially of the subject.[1] The signs will of course again come under notice in treating of the diagnosis of the individual diseases affecting the respiratory system.

Percussion.

The signs obtained by percussion are six in number, namely, flatness, dulness, tympanitic, vesiculo-tympanitic, cracked-metal and amphoric resonance. The two last named signs may with propriety be reckoned as varieties of tympanitic resonance.

Flatness.—Flatness is the absence of resonance. It is illustrated by percussing over a mass of bone and muscle, *tanquam percussi femoris.*

With this definition, flatness represents these morbid physical conditions: The presence of liquid in the pleural cavity, or in the air vesicles, complete solidification of lung, and an intra-thoracic tumor. One of these conditions must be present whenever there is flatness on percussion. This sign thus enters into the physical diagnosis of pleurisy with large or considerable effusion, empyema, pneumonia in the second stage, pulmonary œdema, and, in some cases, cancer of lung.

Dulness.—Dulness means more or less diminution of the normal resonance. It has every degree of gradation between the slightest appreciable diminution, and the closest approximation to flatness. As a rule, an increase of the solids or fluids within the chest, if not sufficient to give rise to flatness, causes dulness in a degree proportionate to the increase; and the diminution of air, without any increase of the solids or fluids has the same effect. Increase of solids, as in pneumonia, phthisis and carcinoma; or of liquids as in œdema, pleurisy, hydrothorax and pulmonary congestion; or diminution of air, as in collapse of pulmonary lobules, occasion dulness on percussion, provided these physical conditions are not sufficient to produce flatness. It is sufficiently precise to distinguish different degrees of dulness, by such terms as slight, moderate, considerable, great, and very great. The pitch of sound in dulness is always higher than that of the normal resonance of the patient; and this character assists in recognizing a slight deviation from the resonance of health.

Tympanitic Resonance.—A resonance is tympanitic when it is devoid of the vesicular quality which characterizes the normal resonance. This character distinguishes the sign without regard to the intensity of the sound. It may be more or less intense than the resonance of health. The pitch is always higher than that of the normal resonance.

The condition requisite for this sign is air in a space, or in spaces, of some size; in other words the sound must not be derived from air in the pulmonary vesicles. This condition exists in the following affections; pneumothorax, or air in the pleural space; pulmonary cavities, which, when not filled with morbid products, contain air, and affections in which there is solidification of lung over the primary and secondary bronchi. The affections last referred to, are pneumonia affecting the upper lobe, and phthisis. The tympanitic resonance is derived from the air in the bronchial tubes, the intervening pulmonary solidification excluding vesicular resonance.

---

[1] *Vide* Physical Exploration and the Diagnosis of Diseases affecting the Respiratory System, and Manual of Percussion and Auscultation, by the author.

A tympanitic resonance is often propagated upward from the stomach, and sometimes from the colon, especially when the lower lobe is solidified.

Vesiculo-tympanitic Resonance.—This sign, as the name signifies, is a tympanitic resonance with an admixture of more or less of the vesicular quality of the normal resonance. The intensity must be greater than the resonance of health, otherwise the sign is not distinguishable from dulness. It is sometimes notably intense. The pitch is always higher than that of the normal resonance of the patient.

A vesiculo-tympanitic resonance is the percussion sign of pulmonary or vesicular emphysema. It is also produced by percussing over lung above the level of liquid in cases of pleurisy with moderate effusion, and over the unaffected lobe in cases of lobar pneumonia on the side of the affection.

Cracked-metal and Amphoric Resonance.—In these signs the resonance is tympanitic, with the addition, in the first, of a chinking sound, and, in the second, of a musical tone resembling that produced by blowing over the open mouth of a phial. The resonance is not infrequently both cracked-metal and amphoric.

They have, each, the same significance; they denote pulmonary cavities with some exceptions. The exceptions are instances in which solidified lung intervenes between the chest-wall and the bronchi exterior to the lung; the signs then being derived from the latter. In rare instances they may be produced in healthy children by percussing over the site of these bronchi.

An acquaintance with the characters of the normal vesicular resonance, and of the disparity between the two sides of the chest in different regions, is essential as preliminary to the study of signs of disease obtained by percussion.

Auscultation.

Auscultatory signs are produced by the acts of respiration, by the voice, and by the whisper. They are divided into those which are abnormal modifications of the signs obtained in health, and those which are new or adventitious sounds. The latter are called râles. Following this division, the different respiratory signs will be noticed, and, in connection therewith, the correlative vocal and whispering signs.

Diminished and Suppressed Respiratory Murmur.—The murmur of respiration is diminished and may be suppressed by obstructive conditions within the larynx or trachea. The signs are then bilateral, that is, the murmur is diminished or suppressed equally on both sides of the chest. These signs, therefore, enter into the diagnosis of the different affections of the larynx and the trachea, which involve more or less obstruction. These affections do not alter the respiratory murmur as regards quality and pitch. If the lungs be free from disease, there are no correlative signs referable to the voice or whisper.

Feebleness or absence of the respiratory murmur on both sides of the chest may be due to paralysis of the diaphragm, or bilateral paralysis affecting the costal muscles.

Unilateral diminution or suppression of the respiratory murmur, denotes either obstruction of the primary bronchus, or diminished movements on the affected side, either from pain or paralysis, provided these are the only signs. Pleuritic effusion, pneumothorax, and solidification of lung may suppress the murmur on one side; but other signs are then present, representing these conditions. If the murmur be suppressed by liquid or air in the pleural space, the normal vocal resonance, as a rule, is diminished or suppressed.

The murmur of respiration may be diminished or suppressed within a portion of the chest on one side from obstruction of a bronchial tube of greater or less size.

Bilateral diminution or suppression of the murmur is caused by obstruction of the small-sized bronchial tubes. This occurs when the obstruction is due to inflammation (capillary bronchitis) and to spasm (asthma). These signs are then always associated with either dry or moist bronchial râles.

Dilatation of the air-cells (emphysema) causes diminution, and may cause suppression, of the murmur, over a portion of the chest, generally the upper portion, on one or both sides. The signs are then associated with vesiculo-tympanitic resonance on percussion, and often with dry bronchial râles.

A tumor within the chest may occasion suppression of murmur within a certain space. Either dulness or flatness on percussion will then be present. The vocal resonance over the site of the tumor may be either diminished or increased according to the relations of the tumor to the large bronchi. If the tumor be in close relation to the latter there may be bronchophony.

Increased Murmur of Respiration.—This sign occurs on the unaffected side in cases of unilateral diminution or suppressed from any cause.

Shortened Inspiratory and Prolonged Expiratory Sound.—These occur in cases of pulmonary emphysema, and are accompanied by corresponding alterations of rhythm in the acts of respiration. Similar alterations in the inspiratory and the expiratory sound are associated with other abnormal characters in the bronchial and broncho-vesicular modifications of respiration.

Bronchial and Broncho-vesicular Respiration.—These important signs represent different degrees of solidification of lung.

The *bronchial respiration* is usually present if the solidification be complete or considerable. Its distinctive characters are these: a shortened inspiratory and a prolonged expiratory sound, each tubular in quality, and high in pitch, the expiratory generally being louder and higher in pitch than the inspiratory sound. This sign enters into the diagnosis of pneumonia in the second stage, phthisis, condensation of lung from the pressure of liquid, air, or a tumor, carcinoma, and collapse of pulmonary lobules.

The *broncho-vesicular respiration* is the sign of slight or moderate solidification. Its characters are those of the bronchial and the vesicular respiration combined in variable proportions. If the solidification be slight, the inspiratory sound is slightly tubular and raised in pitch, the expiratory sound being somewhat prolonged, high, and tubular. A moderate solidification renders the inspiratory sound more tubular and less vesicular, the expiratory sound being more prolonged, tubular, and high in pitch.

This sign is presented in varying gradations in the resolving stage of pneumonia, in cases of phthisis, and whenever the solidification is not sufficient to produce a purely bronchial respiration.

The condition represented by bronchial respiration generally occasions notable dulness or flatness on percussion. The correlative vocal sign is *bronchophony*, the voice of the patient being concentrated, apparently near the ear, and raised in pitch. *Whispering bronchophony* is also present, whispered words causing an intense, high pitched, tubular sound, corresponding in these characters to the expiratory sound in the bronchial respiration.

The slight or moderate solidification represented by the broncho-vesicular respiration occasions moderate or slight dulness on percussion. The correlative vocal sign is *increased vocal resonance*, that is, the normal resonance more or less intensified without other notable change. The sound transmitted by the whisper is moderately intense, the quality faintly tubular, and the pitch somewhat raised, in these characters corresponding to the expiratory sound in the broncho-vesicular respiration.

Cavernous Respiration.—As the name denotes, this is a sign of cavity. Its characters are, lowness of the pitch of the inspiratory sound, which has a simple blowing quality, that is, it is neither vesicular nor tubular; and an expiratory sound still lower, and the same characters as the inspiratory sound in respect of quality and pitch. The sound obtained by the whisper is low and blowing, corresponding to the expiratory sound in the cavernous respiration. The correlative vocal sign is increased vocal *resonance*. The speech is sometimes transmitted, that is, the articulated words constituting the vocal sign called *pectoriloquy*. This however, is not exclusively a cavernous sign. It may be a sign of solidification of lung; but, if so, the characters of bronchophony coexist, whereas if it be purely a cavernous sign, the vocal sound is intensified without the bronchophonic characters. The transmission of words with the whisper is *whispering pectoriloquy*. This, too, may be a sign of solidified lung, as well as of a cavity. If of a cavity, the pitch is low; if of solidified lung, the pitch is high.

With cavernous respiration are often associated cracked-metal and amphoric resonance on percussion.

The respiratory sound is *broncho-cavernous* when the characters are those of bronchial and cavernous respiration combined, denoting solidified lung in proximity to a cavity. Under these circumstances, bronchophony may exist over the site of a cavity.

Amphoric Respiration.—The respiratory sound is amphoric when it has a musical intonation resembling the note produced by blowing over the open mouth of a phial. This sign is often present in cases of pneumothorax from perforation of lung. It is occasionally a sign of phthisical cavities. Correlative signs are the amphoric voice, the amphoric whisper, and the amphoric cough. In cases of pneumo-thorax, it is frequently associated with metallic tinkling, a sign heard with respiration, voice, whisper, and cough.

Adventitious Sounds or Râles.—These are produced in different situations, namely, the air passages, the vesicles of the lungs, pulmonary cavities, and on the pleural surfaces.

In the trachea and bronchial tubes, râles are caused by the bubbling of thin mucus, purulent liquid, serum, and blood. When produced in the bronchial tubes, they are called the *moist bronchial or bubbling râles.* They give the impression of large-sized bubbles when produced in the larger, and of small-sized bubbles when produced in the smaller, tubes. These differences are commonly expressed by the terms coarse and fine. The moist râles, therefore, are evidence, not only of the presence of liquid of some kind, but of the calibre of the tubes in which they are produced. The fine bubbling sound produced by liquid in the very small bronchial tubes is called the *subcrepitant râle.*

The moist bronchial or bubbling râles enter into the diagnosis of bronchitis affecting the larger tubes, the so-called capillary variety of this affection, pneumonia, phthisis, bronchorrhagia, and pneumorrhagia The râles are high in pitch if the lung surrounding the tubes in which they are produced be solidified, and they are comparatively low in pitch if there be no solidification.

The râles called, in distinction from the preceding, the *dry bronchial râles*, are caused by contraction of the calibre of the tubes from the presence of viscid mucus and swelling of the membrane, but more especially from spasm of the bronchial muscular fibres. They are said to be *sonorous* if low, and *sibilant* if high, in pitch. Both are always present, and generally very abundant, on both sides of the chest in asthma. They occur in bronchitis, whether primary or secondary to other pulmonary affections, for example, phthisis. In the latter connection they are comparatively unimportant.

The *crepitant râle* is produced in the air vesicles. It is a dry, crackling sound, heard only on inspiration, and generally only at the end of the inspiratory act. This sign is almost pathognomonic of pneumonia, occurring in the first stage of this disease, and sometimes during resolution. In the latter connection it is known as the *returning crepitant râle.*

The *cavernous râle* is a sound produced by the agitation of liquid within a cavity by the entrance of air in the act of inspiration. It is called also a *gurgling râle*, and this term is descriptive of its character.

A *pleuritic friction râle* is caused by the rubbing together of the pleural surfaces in the acts of inspiration and expiration, when these surfaces are either rendered sticky by recently exuded lymph, or roughened by lymph which has become dense. It occurs sometimes in the first, but oftener in the third, stage of a primary pleurisy. It accompanies usually both acts of respiration, and seems to come from a situation near the surface. It is sometimes present when pleurisy is secondary to other pulmonary affections, and is of value in the diagnosis of some cases of phthisis.

An acquaintance with the characters of the auscultatory signs in health, and with the variations presented between the two sides of the chest, and in different regions, is an essential requirement for the study of the signs representing morbid conditions.

Inspection.

The examination of the chest with the eye furnishes often important signs. They relate to deviations from health in size and movements. Citing here only some illustrations, unilateral enlargement and diminished respiratory movements are marked signs in cases of pleurisy with large effusion, empyema, and pneumo-hydrothorax; bulging of the anterior superior portion of the chest on both sides, constitutes, in some cases, a deformity which is characteristic of emphysema; notable contraction of one side is evidence of either past pleurisy, interstitial pneumonia, or carcinoma; and a projection within a circumscribed space denotes tumor. These and other signs obtained by this method will enter into the diagnosis of the diseases affecting the respiratory system.

Palpation.

By the application of the palmar surface of the hand to the chest, vibrations produced by acts of speaking are felt. These constitute what is known as *vocal fremitus*. As a rule, the vocal fremitus is abnormally increased over solidified lung. *Increased vocal fremitus* is, therefore, one of the signs of this morbid physical condition. It is correlative to dulness on percussion, bronchial or broncho-vesicular respiration, and increased vocal resonance. The vocal fremitus is diminished or suppressed by the presence of liquid or air within the pleural space. *Diminished and suppressed vocal fremitus*, therefore, are signs correlative to *diminished and suppressed vocal resonance* in cases of pleurisy with effusion, empyema, and pneumo-hydrothorax.

Inequalities of the chest may be appreciated by the touch as well as by the eye. For example, the loss of the intercostal depressions on the antero-lateral aspect of the chest on one side is as readily determined by the hand as by inspection.

With the hand applied to the chest, the respirations are enumerated more readily than by inspection.

Liquid in the pleural space, sufficient to dilate the chest, gives, in some cases, a sense of fluctuation when pressure or percussion is made at a little distance from the place where the hand is applied.

The increased resistance to pressure over a collection of liquid in the pleural space, or over solidified lung, is a sign of some value, obtained by palpation.

Mensuration.

This method consists in measurements with tape or with callipers in order to determine with exactitude abnormal deviations in size. Instruments are also sometimes employed to measure accurately the movements of the whole chest, or those of each side, and of particular regions, separately. For clinical purposes, however, inspection suffices, and the reader is therefore referred to works treating fully of the physical exploration of the chest for details concerning the employment of mensuration.

Succussion.

This ancient method consists in shaking the patient, while the ear is either in contact with, or in close proximity to, the chest. It furnishes an important sign, namely, a splashing sound when air and liquid are contained within the pleural space. This sign is pathognomonic of pneumohydrothorax, and by means of it, the diagnosis of that affection can generally be made in an instant.

The young medical student may perhaps need to have the fact impressed that neither air nor liquid alone in the pleural space gives rise to a succussion sound ; both air and liquid must be present.

Laryngoscopy.

Laryngoscopy is the inspection of the interior of the larynx by means of an image reflected from a mirror introduced into the fauces. For an account of the laryngoscope, of the different methods of illumination, and details relating to the employment of this method of examination, the reader is referred to works treating specially of the subject.[1]

It is only within the last two decades that clinical medicine has embraced an ocular examination of the larynx. This extension of direct observation has proved of great value in the diagnosis and treatment of laryngeal affections. The practice of laryngoscopy is not attended with great difficulty. A little attention to it, especially if under the direction of a practical teacher, suffices to enable the practitioner to avail himself of its advantages. Instruction, therefore, in this method of examination, should be included in the curriculum of medical studies.

By means of the laryngoscope the intensity and extent of laryngeal inflammation may be determined by the visible appearances. In acute inflammation, however, as well as in œdema of the glottis, spasmodic and other affections, which cause great embarrassment of breathing, its use is attended with difficulty and may be impracticable. As its use requires non-resistance on the part of the patient, it is often not available in young children. It is chiefly of value in cases of chronic inflammation, ulcerations, morbid growths and paralysis affecting the muscles of the larynx. The nature of the affection, the character and extent of lesions, their precise situation and, in some cases, the presence of foreign bodies are determinable by laryngoscopic examination, and they cannot be determined otherwise with any approach to exactness. Moreover, in a negative point of view the laryngoscope is often of much value ; it enables the practitioner to exclude certain laryngeal affections.

---

[1] The American reader may be referred to Diseases of the Throat, etc., by J. Solis Cohen, M.D., 1872, and to the American edition of Ziemssen's Cyclopædia, vol. iv.

THE DIAGNOSIS AND TREATMENT OF DISEASES OF THE RESPIRATORY SYSTEM.

I.

ACUTE INFLAMMATORY DISEASES OF THE RESPIRATORY ORGANS WITHIN THE CHEST.

PLEURISY, PNEUMONIA, BRONCHITIS, AND CAPILLARY BRONCHITIS.

In this division are embraced acute pleurisy (pleuritis), acute pneumonia (pneumonitis), acute bronchitis, seated in the larger, and bronchitis affecting the smaller bronchial tubes. Bronchitis, without any qualifying term, will be understood as meaning inflammation limited to the larger tubes. To distinguish bronchitis affecting the smaller tubes, the term commonly used, namely, capillary, will be adopted. Capillary bronchitis differs so much from bronchitis which is not capillary, as regards symptoms, signs, and gravity, that clinically, it is a distinct affection, although generally associated with the latter.[1]

These four affections, in typical cases, are not likely to be confounded with others. The local and general symptoms obviously point to some acute disease within the chest. In regard to diagnosis, the only question which arises at the bedside is, With which one of these affections have we to deal? The answer to this question calls in requisition knowledge of the symptoms and physical signs which are involved in the differentiation of each from the others. These symptoms and signs will be now considered, it being understood that the affections are supposed to be primary and, in respect of clinical history, not deviating materially from their type-forms. The varieties of each of these affections will be afterward considered.

Diagnostic Symptoms.

Prodromic Events and Invasion.—Acute pleurisy generally occurs without having been preceded by any event having a premonitory significance. The invasion is usually sudden, and not infrequently during the night. It is often accompanied by chilly sensations and shiverings, but rarely by that sense of coldness and the rigor which characterize the cold stage of a paroxysm of intermittent fever, and which is understood by the term chills.

---

[1] The term bronchitis is to be understood as embracing the affections to which the German writers apply the name bronchial catarrh.

Acute pneumonia occurs without premonition; the invasion is abrupt and is apt to be during the night. Unlike acute pleurisy, the first event is generally a well-pronounced chill. This has considerable weight in differentiating pneumonia from pleurisy.

Acute bronchitis in the great majority of cases is preceded by either coryza, pharyngitis, or subacute laryngitis, and not infrequently each of these in succession. Their occurrence immediately preceding an acute affection within the chest is presumptive proof that the latter is bronchitis. The development of acute bronchial inflammation is very rarely accompanied by a chill, but chilly sensations are not uncommon.

Capillary bronchitis is preceded by bronchitis affecting the larger tubes. There are some exceptions to this rule. The invasion of the smaller tubes is not accompanied by chill.

Local Symptoms.

The symptoms, both local and general, which belong to the early part of the course of these affections, have special importance as bearing on the differential diagnosis, and attention will be chiefly directed to these.

Pain.—Pain is a prominent symptom at the outset, in the vast majority of the cases of acute pleurisy. The pain is sharp, lancinating, and felt especially in the act of inspiration. The pain increases during this act, so that the patient instinctively arrests it before it is fully completed. The pain is more or less diffused over the affected side of the chest, but is referred more particularly to the lower anterior lateral portions. It gradually diminishes in proportion as the pleural surfaces are covered with fibrinous exudation, and the expansion of the lung is restrained by liquid effusion. During the greater part of the course of the disease, however, more or less of the same character of pain is felt if the patient take a deep inspiration.

In acute pneumonia, as a rule, with not very infrequent exceptions, pain follows the initial chill, and has the same character as in acute pleurisy. But the pain in this affection is localized within a circumscribed space in the mammary region. This localization is distinctive. The pain is also, in most cases, less intense and its continuance is shorter than in pleurisy; but the duration is variable in both pneumonia and pleurisy.

In acute bronchitis, sharp, lancinating pain is wanting. Pain in general is not a prominent symptom. That which is felt is dull or contusive, and often amounts only to a feeling of soreness. It is referred to the sternal region. It is often complained of only as connected with fits of coughing. It ceases when the intensity of the inflammation diminishes and the expectoration becomes abundant and opaque.

In capillary bronchitis, pain is not a source of much suffering. Substernal pain or soreness is referable to the coexisting inflammation of the larger tubes. In both forms of bronchitis, if cough be violent, the patient may suffer from pain at the base of the chest referable to the acts of coughing.

Cough and Expectoration.—Cough is not a prominent symptom in acute pleurisy, but it is rarely entirely wanting. It is dry, short, and evidently suppressed as much as possible, on account of the pain which it occasions. If there be any expectoration, it consists of only a little mucus, provided a bronchitis did not exist at the time of the pleuritic attack.

The invasion of acute pneumonia is, with rare exceptions, soon followed by cough and expectoration. In proportion to the lancinating pain, the cough is painful and suppressed, as in acute pleurisy. The expectoration is that commonly known as *rusty*, which has been already described (*vide* page 65). It is highly diagnostic, and in association with other local and general symptoms suffices for the diagnosis. But it may be absent in cases which, in other respects, are typical. This characteristic expectoration after a few days gives place to muco-purulent sputa, or sometimes to the prune-juice expectoration.

Cough is never wanting in cases of acute bronchitis. The bronchial expectoration is at first small, glairy, and not infrequently streaked with blood. In a few days it becomes more or less abundant, and opaque. At the outset the patient has a sense of the presence of matters in the bronchial tubes with a desire for their expulsion (bronchial tenesmus); and the pain or soreness felt in acts of coughing do not prevent voluntary efforts by which the cough is made violent. The purely reflex cough is sometimes violent, that is, spasmodic.

The cough, in cases of capillary bronchitis, which is dependent on the latter, and not on inflammation or the presence of mucous secretions in the larger tubes, has for its object the removal of the obstructing accumulations in the small tubes, and is with difficulty effective owing to the embarrassment of respiration. Neither the character of the cough nor the expectoration is diagnostic of this affection.

Respiration and Dyspnœa.—The respirations are increased in frequency early in cases of pleuritis, the increase before serous effusion being proportionate to the degree of pleuritic pain in inspiration, and the degree of fever. The pain occasions multiplication of the respiratory acts to compensate for the incomplete inspirations. It is, however, rare for the disturbance of respiration at this period of the disease to give rise to notable dyspnœa. After considerable liquid effusion, and in proportion to the rapidity with which it takes place, the respirations are frequent and dyspnœa may be marked.

For precisely the same reasons, increased frequency of the respirations is a symptom in the first stage of pneumonia, but generally without much dyspnœa. Oftener the respirations are frequent, other things being equal, to the amount of lung solidified. There is rarely dyspnœa if the affection be limited to a single lobe; and it is not always marked if more than one lobe become affected.

Bronchitis occasions but little if any increase in the frequency of respiration, and dyspnœa is not a symptom. The explanation is obvious; the affection occasions little or no bronchial obstruction, and the symptomatic fever is rarely intense. Even if bronchial tubes of considerable size be temporarily obstructed, the increased expansion of the vesicles which are in relation to the unobstructed tubes compensates, and there is no embarrassment of respiration.

Capillary bronchitis, on the other hand, involving, as it does, bilateral obstruction of the smaller tubes, renders the respirations very frequent, from forty to sixty per minute, giving rise to notable dyspnœa or orthopnœa. The contrast between this affection and bronchitis affecting the larger tubes is marked. The frequency of respirations and the dyspnœa are more prominent as symptoms of capillary bronchitis than in the most severe cases of pleurisy or pneumonia.

Physical Signs.

Inspection.—Inspection in cases of acute pleurisy shows diminished respiratory movements of the affected side, due to pain in the first stage, and, afterward, to pleuritic effusion. The latter may be sufficiently large to cause dilatation with abolition of the intercostal depressions; but this is rare in the acute form of the disease.

In cases of acute pneumonia, the movements on the affected side are, also, in the first stage restrained by the pain, and afterward the range of motion may be lessened by the volume and incompressibility of the solidified lobe or lobes.

Bronchitis gives no sign on inspection.

In cases of capillary bronchitis, in addition to the rapid succession of the respirations, both sides of the chest may be expanded anteriorly, and the base retracted in the act of inspiration, as in cases of emphysema and asthma.

Percussion.—In the first stage of acute pleurisy, there is but little, if any, diminution of the resonance obtained by percussion on the affected side of the chest. The diminished expansion of the lung on this side, and the greater expansion on the opposite side, may occasion a slight disparity between the two sides in resonance. When liquid effusion has taken place, there is dulness over an extent proportionate to the quantity of liquid, and, if this be considerable, there is flatness. If the patient be raised to the sitting posture, the dulness or flatness extends from the base upward, and the upper boundary, on either the anterior, lateral, or posterior aspect of the chest, corresponds to a horizontal line. When the posture is changed to recumbency on the back, the resonance extends below the horizontal line, owing to the change of the level of the liquid. Above the liquid the resonance is vesiculo-tympanitic. With these signs and the presence of symptoms denoting an acute inflammatory affection, the diagnosis of acute pleurisy is established.

In cases of acute pneumonia, slight dulness in the first stage is appreciable over the affected lobe. When solidification of the lobe has taken place, the dulness is increased and there may be flatness. The dulness or flatness is limited to a space corresponding to the affected lobe, and is not affected by changes in the position of the body. Over the unaffected lobe, the resonance is vesiculo-tympanitic. With these signs, and the presence of symptoms denoting an acute inflammatory affection, the diagnosis of acute pneumonia is established.

In cases of bronchitis, percussion furnishes no signs. The only exception to this statement is that an accumulation of sputa in the large bronchial tubes on one side, may give rise to a slight relative dulness.

Capillary bronchitis *per se* furnishes no signs on percussion. If dulness exist, it is due to collapsed lobules or lobular pneumonia. Increased or vesiculo-tympanitic resonance may be due to transient emphysema.

Auscultation.—The respiratory murmur is weakened by the restrained movements of the affected side, on account of pain, in the first stage of acute pleurisy. After the occurrence of liquid effusion, the murmur is suppressed over a space corresponding to the amount of liquid, and it is more or less feeble above the level of the liquid from lessened expansion of the lung. In some cases in which the chest is partially filled, the sign known as ægophony is heard near the level of the liquid. This sign is a modification of bronchophony. Prior to the effusion of liquid, careful exploration at all points will often lead to the discovery of a slight pleural friction sound. This is much oftener observed after the absorption of the effused liquid.[1]

The respiratory murmur in the first stage of acute pneumonia is weakened for the same reason as in the first stage of acute pleurisy. The first stage of pneumonia is characterized by the crepitant râle which is present, not constantly, but in a considerable proportion of cases. This râle limited to one side and associated with the symptoms of an acute inflammatory affection, establishes the diagnosis of acute pneumonia. When solidification has taken place, there are usually present the respiratory and vocal signs representing this physical condition, namely, bronchial respiration, bronchophony, and bronchophonic whisper. During the stage of resolution, the bronchial respiration gives place to the broncho-vesicular respiration, the latter acquiring more and more the characters of the normal vesicular murmur, until the resolution is completed. Bronchophony, also, disappears, and the vocal resonance is merely increased until the normal vocal resonance is regained. A pleural friction râle is not uncommon.

The respiratory murmur is unchanged in cases of bronchitis, save that, from partial or complete obstruction of bronchial tubes by sputa, it may be weakened or suppressed over limited portions of the chest corresponding to the area of lung supplied by the obstructed tubes. This weakening or suppression of the murmur is transient, continuing only until the obstructing sputa are expectorated. Dry and moist bronchial râles may be present more or less abundantly and more or less diffused, but these signs are often wanting. Vocal resonance, fremitus, and the bronchial whisper are unaffected. The foregoing negative points, if the symptoms denote an acute inflammatory affection, establish, in connection with the local symptoms, the diagnosis of acute bronchitis.

The respiratory murmur is notably weakened or suppressed on both sides of the chest in cases of capillary bronchitis. Subcrepitant râles are heard on both sides, especially on the posterior aspect of the chest. These râles are low in pitch. The vocal signs of health are not materially changed. The subcrepitant râles of low pitch on both sides, in conjunction with the negative points, and symptoms denoting an acute inflammatory affection, establish the diagnosis of capillary bronchitis.

---

[1] The auscultatory signs when the affected side of the chest is filled with liquid will be stated in connection with chronic pleurisy and empyema.

Palpation.—By palpation the diminution or abolition of fremitus over liquid effusion in cases of pleurisy is ascertained. The fremitus is sometimes increased and sometimes diminished over the solidified lobe or lobes in pneumonia. In both forms of bronchitis, examination by this method is negative. The affected side of the chest is tender on pressure in cases of acute pleurisy and acute pneumonia.

Mensuration.—The diminished respiratory movements on the affected side in pleurisy and pneumonia may be accurately measured, and also the enlargement caused by liquid effusion. For all practical purposes, however, inspection suffices.

Succussion.—A succussion-sound is not heard in either of the affections now under consideration.

General Symptoms.

The symptoms which are criteria of the degree of symptomatic fever have a bearing on the differential diagnosis and the treatment. These symptoms are the temperature and the pulse.

The symptomatic fever in acute pleuritis, in general, is not very intense. The maximum of axillary temperature is 102° or 103°, and the frequency of the pulse is rarely much above 100 per minute.

The fever in acute pneumonia is more intense, the temperature often rising to 104° and 105°; and the pulse is proportionately more frequent.

In acute bronchitis the fever is less than in acute pleurisy, the temperature rarely rising to 102°, and the pulse not often exceeding 100 per minute.

In capillary bronchitis the temperature, as a rule, is not high, seldom exceeding 102°, but the pulse is disproportionately frequent.

Lividity of the prolabia and face is a symptom of acute pleurisy only when the pleuritic effusion is rapid and considerable. In acute pneumonia it is not marked unless more than one lobe be affected or the affection be complicated with cardiac thrombosis. It is not a symptom of bronchitis. But in capillary bronchitis it is often a prominent symptom. When it occurs in either of these affections it represents, not so much deficient oxygenation of the blood, as distension of the right cavities of the heart, giving rise in some cases to coagulation of fibrin or thrombosis in these cavities.

A circumscribed flush in one or both cheeks is highly diagnostic of acute pneumonia.

Of the four affections under consideration, pneumonia occasions the greater degree of muscular prostration. Delirium and other symptoms indicative of the typhoid state are much oftener present in this than in the other affections.

Facts in the etiology of these affections, which have a bearing on the diagnosis, relate to the relative frequency of their occurrence and the predisposition incident to age. Of the four affections, bronchitis occurs much more frequently than the others. Pneumonia ranks next in the frequency of its occurrence. Acute pleurisy occurs less frequently than pneumonia, and capillary bronchitis is comparatively rare. Acute pleurisy is of rare occurrence in old age and infantile life. Pneumonia seldom occurs in a child under five years of age, but advanced age involves no exemption from it. Bronchitis is common in all periods of life, but occurs most frequently in infancy and childhood. Capillary bronchitis is a very rare affection exclusive of infancy and old age.

Treatment of Pleurisy, Pneumonia, Bronchitis, and Capillary Bronchitis.

The intrinsic tendencies of diseases as regards their termination in death or recovery, and, in fatal cases, the modes of dying, are important points to be considered in relation to treatment.

Acute pleurisy, when idiopathic and uncomplicated, has no tendency to a fatal termination. If it prove fatal *per se*, the immediate cause of death is a rapid and large pleuritic effusion, and the mode of dying is by apnœa. Instances are extremely rare.

Acute pneumonia, idiopathic, uncomplicated, and limited to one lobe, tends to recovery. The invasion of more than one lobe increases the gravity of the disease. In fatal cases the mode of dying is by asthenia. The liability to cardiac thrombosis is greater in this than any other disease. This liability is chiefly in the cases in which two or three lobes are involved. In a considerable proportion of fatal cases this is the immediate cause of death.

Acute bronchitis never in itself destroys life after infancy.

Capillary bronchitis is attended with great danger to life, in children and aged persons proving fatal in a very large proportion of cases. The mode of dying is by predominant apnœa.

ACUTE PLEURISY.

Bloodletting at the outset is admissible in a healthy subject, inasmuch as the tendency of the disease is to recovery. The advantages of bloodletting are its promptness and efficiency in relieving pain and dyspnœa. It cannot be assumed to be either an abortive or a curative measure; nor is there ground for supposing that it will limit pleural effusion. It is a palliative measure, and is indicated when the suffering claims as speedy relief as possible. With a little delay, relief may be procured by other means. Dry cupping is a prompt and efficient measure. The number of cups applied should be considerable—from eight to twelve. Sinapisms afford not a little relief. A blister should not be applied at this period of the disease. Warm fomentations, by means of a poultice or the water dressing, relieve the suffering. The spongio-piline is an excellent substitute for the usual water dressing. Much relief of pain is sometimes afforded by the application of strips of adhesive plaster, so as to restrain the movements of the affected side. The employment of cold by means of the ice bag, or cloths dipped in ice-water and renewed at short intervals, has as yet not come into vogue in this country. This measure may be tried, and warm fomentations substituted, if it be not effectual. In conjunction with measures which have just been mentioned, opiates should be given, especially if the patients do not suffer from their after-effects. The salts of morphia are the most efficient, and the hypodermic administration the most speedily effective. Opiates in this, as in all inflammatory affections, diminish the intensity of the inflammation. After the local symptoms have been relieved, unless there be special contraindications, moderate hydragogue purgation is useful by way of depletion, and by limiting the amount of effusion. For this purpose, the pulvis purgans, Epsom salts, the Rochelle salts, and the citrate of magnesia are appropriate. The intensity of the fever is rarely sufficient to call for anti-pyretic treatment. If the pulse be frequent, aconite, or the veratrum viride may be given as cardiac sedatives.

After the first stage, the object of treatment is to hasten removal of the liquid by absorption. Diuretic remedies, and occasionally hydragogues are indicated for this object. These should not be pushed too vigorously, inasmuch as, not infrequently, absorption goes on rapidly, irrespective of any measures for that object. Small blisters and painting the affected side of the chest with iodine are useful. Confining the patient to a dry diet for several days has been recommended. The discomfort of this treatment is such that other measures are to be preferred. The amount of fluids ingested, however, should be restricted as far as is compatible with comfort.

If the effusion be rapid and considerable enough to embarrass respiration, and prompt relief be not obtained by a hydragogue, aspiration should be at once resorted to. Under these circumstances, before resorting to aspiration, free purgation by elaterium may be resorted to. The author believes that in aspirating the chest the unguarded needle should not be used, on account of the danger of injury to the lung when it expands and comes into contact with the sharp needle point. There is no objection to the use of a small or a moderate-sized trocar.

When the liquid is reduced to a small quantity, it is unnecessary to continue active measures to promote absorption. A full diet, tonic remedies, and early gestation in the open air, will do much toward hastening its completion and expediting restoration. The patient is to be enjoined against violent exertions during convalescence, in order to avoid rupture of the newly-formed tissue uniting the pleural surfaces.

ACUTE PNEUMONIA.

Pneumonia is reckoned among the local diseases, and it has been customary to consider it with regard to certain questions, especially concerning bloodletting, as the type of an inflammatory affection. To the mind of the author it seems clear that it is essentially a fever of which the pneumonia is the anatomical characteristic. Pneumonic fever, or the old name lung fever, is as appropriate as the term enteric applied to typhoid fever.

The discussion of pathological questions does not enter into the plan of this work.[1] The doctrine just stated is referred to because, in a rational point of view, it influences the treatment of acute pneumonia.

---

[1] This doctrine is cogently set forth by Juergensen, *vide* Ziemssen's Cyclopædia, vol. v. *Vide* article by the author in the Trans. of the Med. Society of the State of New York, 1877.

Acute pneumonia sometimes aborts spontaneously. A few instances have fallen under the author's observation. By this is meant that, after the diagnosis is rendered positive by rusty sputa, the crepitant râle, and a bronchial or broncho-vesicular respiration within a limited area, together with fever, the disease ceases to progress, and recovery at once follows. The author has observed a few such instances when bloodletting was employed; but, going back to the time when this measure was always employed as soon as the first manifestations appeared, we must conclude that it rarely cuts short the disease. That quinia is successful in rendering the disease abortive in a certain proportion of cases, there can be no doubt. During the past few years the author has observed instances too numerous to be accounted for on the supposition that the abortion was spontaneous. For this object, from twenty to forty grains of the remedy may be given to an adult, either in a single dose or in two or three doses during the day. There can be no objection to making trial of the remedy for this object in every case. There is ground for the belief that the disease may be thereby favorably modified, if not arrested.

Bloodletting promptly relieves the pain, as in cases of acute pleurisy. There is, however, a restraining consideration in the employment of this measure in pneumonia, which does not apply to pleurisy, namely, pneumonia involves danger to life, and the mode of dying is by asthenia. Bloodletting impoverishes the blood, and thereby impairs the vital powers. That the risk of harm in this direction has been of late years much exaggerated is certain, in view of past experience, when bloodletting was resorted to very freely in the treatment of this disease. If bloodletting be employed, it should be limited to cases in which the conditions for its tolerance are present, such as full health at the time of the attack, vigorous action of the heart, arterial tension, etc. In general, it may be assumed that the objects of bloodletting may be obtained as effectually, although less promptly, by other means not open to any doubt. These are the application of cups in considerable number, followed by opiates, fomentations, and sinapisms for the relief of pain, moderate hydragogue purgation as a method of depletion, and the use of cardiac sedatives, namely, aconite and the veratrum viride. The use of the latter remedies is to be regulated by the frequency and force of the pulse.

The most important indications are derived from the fever and the sources of immediate danger. Antipyretic measures hold a prominent place. They are indicated whenever the axillary temperature reaches 103°. For this object quinia is a remedy of great power, and, within certain limits, is a remedy that does no harm if the object be not attained. It may be given to the point of cinchonism, the doses required varying much according to the difference of susceptibility to this remedy. Salicin and the salicylic acid appears to have a similar power, but their relative value is yet to be determined by clinical observations. The direct abstraction of heat by cold baths, repeated whenever the thermometer shows a temperature at or above 103°, as is now practised here, as well as abroad, in cases of continued fever, has not been adopted to much extent in this country; but the testimony of Juergensen and Liebermeister, together with the facts reported by these and other German writers, show, not only this method with proper precautions to be safe, but that it diminishes the mortality from the disease.

Opiates, after pain has ceased, are often of great service, fulfilling two purposes, namely, procuring sleep, and tranquillizing the nervous system. If these effects follow, typhoid symptoms are forestalled or relieved, and the danger from exhaustion is diminished; in other words, they render the system more tolerant of the disease. Vigilance has much to do with the development of typhoid symptoms and exhaustion, and if opiates do not produce sleep, other hypnotics are indicated, such as the hydrate of chloral and the bromides. Reduction of temperature, however, is often most effectual in procuring sleep and inducing tranquillity. Opiates are contraindicated by symptoms of cyanosis, and difficulty of freeing the bronchial tubes by expectoration. Their favorable effects are sometimes almost magical.

Rubefacients are useful for the relief of pain at any time during the progress of the disease, but beyond this, the propriety of counter-irritation is more than doubtful. Blisters only add to the discomfort of the patient, if they do not do greater harm by increasing the general irritation and preventing sleep.

Supporting measures are indicated in proportion as the symptoms denote a tendency to exhaustion, or, in other words, in proportion as symptoms and signs show failure of the heart's action. (*Vide* Introduction.) The rules in respect to alcoholics and alimentation are those which pertain to the treatment of the essential fevers and all diseases which destroy life by asthenia. Cases of pneumonia sometimes show a greatly increased tolerance of alcoholics. With regard to alimentation, it is to be borne in mind that there is never any danger from over-assimilation, but there may be great danger from a deficient supply of food; and that it is far better to incur risk from too much than too little aliment. Another practical rule is not to be lost sight of, namely, it is better to be guided by the patient's instincts as regards the quantity and the kinds of food, than by any systematic plan of dietetics. Many lives have been sacrificed by confining patients to beef-tea and other forms of sick diet equally innutritious. Milk is a precious article of diet, if solid food cannot be taken. The taking of solid food should be encouraged, and it should be prepared with a view to tempt the appetite; for the question is what can the patient be induced to eat, rather than what articles of diet are allowable. These remarks are not pertinent only to pneumonia; they have a general application.

The immediate cause of death in cases of pneumonia being over-distension of the right cavities of the heart with formation of thrombus, the question arises, What can be done with special reference to this source of danger? The carbonate of ammonia has been of late years much used in this country, as a heart stimulant, and to meet the condition of inopexia. Experience seems to show its usefulness. It should be given only when indicated; the doses should be repeated after short intervals, and it should not be long continued. Alcoholics are most to be relied upon for increasing and maintaining the power of the heart's action. If the effect of these upon the circulation, as shown by the pulse and the first sound of the heart, be carefully observed, the practitioner will be safely guided in their use; and it is to be considered that giving too much is less objectionable than giving too little. It is never advisable to give them to the extent of producing any evidence of alcoholic excitation of the brain. Doubtless alcoholics in the treatment, not only of pneumonia but of other febrile diseases, are sometimes given too largely, and therefore hurtfully; on the other hand, from theoretical ideas, they are not infrequently either withheld or given too sparingly. Here, as with regard to many other points in medical practice, is applicable the old maxim, *inter media tutissimus ibis.*

In the treatment during convalescence, this fact is to be considered: there is no tendency to relapse. A full diet and early going out-of-doors will expedite recovery.

Acute Bronchitis.

When coryza, with or without either pharyngitis or subacute laryngitis, renders probable the supervention of bronchitis, the latter may often be prevented by an opiate at night followed by a hot drink to excite free perspiration, and, the next morning, a saline purgative. The Turkish bath is also successful as a prophylactic measure. A full dose of quinia sometimes succeeds.

The same methods of treatment will not infrequently render the affection abortive if they be resorted to within the first twenty-four hours. When they do not arrest the disease, it is rendered thereby milder and of shorter duration. A full dose of quinia, that is, from fifteen to twenty grains to the adult, is often successful as a preventive and an abortive remedy. Salicin is equally if not more efficient, given in doses of a scruple repeated every two hours, until a drachm or a drachm and a half has been taken. Salicin is devoid of the unpleasant effects (cinchonism) frequently caused by quinia, and is applicable to cases in which the latter could not be given in full doses in consequence of a lack of tolerance of it.

The treatment irrespective of that designed to arrest the disease, is palliative. Some form of opiate, not only relieves the cough and discomfort, but, by its effect upon the inflammatory condition, hastens the secretion of mucus, and is thus virtually an expectorant. The form of opiate selected should be that which the patient has found by experience to be the least likely to give rise to unpleasant after-effects. Codeia is often tolerated when other forms occasion more or less inconvenience. The after-effects of opiates may be prevented or modified by combination with belladonna or atrophia.

The Russian bath is palliative by means of its action on the surface, and also on the inflamed membrane by the inhalation of the steam. Warm vapor inhaled by breathing over a vessel containing heated water, or by the use of a spray-producing apparatus, or by diffusing it throughout the apartment, has a soothing effect, and promotes resolution. Vapor holding in solution opium or some one of the narcotic extracts sometimes relieves a dry cough.

Substernal pain and soreness are relieved by sinapisms and the water dressing. The mustard leaves which are now in use are an excellent substitute for the old-fashioned mustard plaster. The capsicum plaster is equally efficacious. Blisters and methods of counter-irritation other than rubefacients, are not indicated in the treatment of bronchitis.

Nauseant remedies, tartar emetic, ipecacuanha, squill, etc., are, to say the least, of doubtful propriety. They may do harm by interfering with appetite and digestion. The same may be said of the stimulating expectorants which are doubtless useful in cases of chronic bronchitis.

The iodide of potassium and the chlorate of potassa appear to have a certain degree of curative influence in cases of acute, as well as of chronic, bronchitis. Exclusive of an occasional idiosyncrasy as regards the tolerance of the former, these remedies are devoid of harm when they do not do good. Of a saturated solution of the latter, three or four drachms may be given twice or thrice daily to an adult.

The diet of the patient need not be restricted; that is to say, the patient may be guided by appetite in the selection of articles of food and in quantity.

The treatment of acute bronchitis in young children requires some modifications. Opiates are to to be used with greater reserve than in adults, especially after a free secretion of mucus has taken place, in order not to interfere with expectoration. Coughing in young children is a purely reflex act, and if this be arrested there may be distress or danger from an accumulation within the air-passages. If dyspnœa together with physical signs show the presence of mucus, the expectoration is to be effected by emetics. Emetics in children do not occasion perturbation and fatigue as in adults, and therefore they may be resorted to with more freedom. The acts of vomiting excite acts of expectoration, and thus take the place of the voluntary efforts in adults. Of the different emetics, ipecacuanha is to be preferred. The tartrate of antimony and other articles which produce a greater degree of nausea and depression, are contraindicated.

Inasmuch as acute bronchitis has no tendency to destroy life, and is unattended with great prostration, supporting measures of treatment are not called for. Aside from palliation, an object of treatment is to effect a cure in order to prevent the affection from becoming chronic. Another object in treating young children is to prevent collapse of lobules or broncho-pneumonia. This complication will be considered presently as one of the varieties of acute bronchitis.

Capillary Bronchitis.

This affection involving great danger to life, often running a rapidly fatal course, and the mode of dying being by apnœa, bloodletting would seem to be indicated in view of the promptness and efficiency of the relief which it affords. The author has personally experienced from it immediate and permanent relief in two attacks. In adults, when not contraindicated by feebleness of constitution, it is unobjectionable; but this affection is rare except in young children and in advanced age, and at the extremes of life bloodletting should be employed with great reserve if at all. Dry cupping may be substituted. This measure secures much of the advantages of bloodletting; but in young children its benefits are to a certain extent counterbalanced by the apprehensions and excitement which it is apt to occasion.

Opium in this affection is contraindicated by the importance of not blunting the sense of the want of air and the reflex acts of expectoration. In children emetics are to be relied upon for promoting expectoration. The immediate and marked relief which follows emesis attests its value. The use of emetics, however, must not be carried so far as to produce exhaustion, and articles which give rise to great nausea and depression are to be avoided. Ipecacuanha is to be preferred. Powdered alum is appropriate. The kermes mineral and the sulphate of zinc are not inappropriate, these acting promptly and efficiently without much nausea or depression. Apomorphine is recommended by Riegel[1] on the ground of its being attended with less depression and unpleasant after-effects than any other form of emetic. The author cannot speak of this remedy from practical observation. Valuable as are emetics in young children, in old persons they are of doubtful propriety on account of the greater violence of the acts of vomiting, and the prostration to which they may give rise.

Rubefacients and warm fomentations by means of the poultice or water dressing applied to the entire chest, are important measures of treatment.

Feebleness and great frequency of the heart's action call for cardiac stimulants, alcoholics, and the carbonate of ammonia.

The author has witnessed marked relief from the inhalation of oxygen.

VARIETIES OF ACUTE PLEURISY, PNEUMONIA, AND BRONCHITIS.

Circumscribed Pleurisy—Empyema—Pleurisy with Pneumo-thorax—Embolic Pneumonia—Hypostatic Pneumonia—Fibrinous Bronchitis—Broncho-Pneumonia—Epidemic Bronchitis—Pertussis—Summer and Autumnal Bronchitis.

The varieties of acute pleurisy which will be noticed under this heading, are, circumscribed pleurisy, empyema, and pleurisy with pneumo-thorax. The two latter affections will be very briefly noticed in this connection. They will be considered more fully as varieties of chronic pleurisy. Pneumonia caused by embolism, embolic pneumonia, will be considered as a variety of acute inflammation, and hypostatic pneumonia will be noticed in this connection. The varieties of acute bronchitis are, bronchial inflammation with exudation of lymph, called plastic, fibrinous, pseudo-membranous, diphtheritic or croupous bronchitis, broncho-pneumonia or lobular pneumonia, epidemic bronchitis, pertussis or whooping-cough, summer and autumnal bronchitis, the two latter affections being commonly known as hay fever.

CIRCUMSCRIBED PLEURISY.

In primary pleurisy the inflammation is more or less diffused over the pleura, and this is true often of pleurisies which are secondary either to different pulmonary affections or to diseases seated elsewhere, *e. g.*, renal disease and acute articular rheumatism. When pleurisy is circumscribed, that is, limited to a comparatively small space, it is secondary to some pulmonary affection; hence, the existence of a circumscribed pleurisy is evidence of a coexisting pulmonary affection. Its importance is chiefly in this significance. In the majority of cases the inflammation is subacute, but the local or general symptoms, in a certain proportion of cases denote acuteness of the inflammation. A fact which distinguishes circumscribed from diffused pleurisy is the absence of serous effusion; it is attended by the exudation of lymph only, and hence is said to be dry. The adhesions, so often found after death, of portions of the pleural surfaces, are evidence of dry circumscribed pleurisy which had occurred at periods more or less remote.

---

[1] *Vide* Ziemssen's Cyclopædia, vol. iv. Am. ed. page 418.

The pulmonary affection of which a dry circumscribed pleurisy is symptomatic, are pneumonia, either lobar, embolic or lobular, phthisis, and morbid growths. Taken in connection with symptoms and signs other than those relating to the pleurisy, the existence of the latter enters into the diagnosis. In a patient seized with a pronounced chill followed by a lancinating pain near the nipple and high fever, pleuritic friction murmur sometimes precedes the signs which denote an acute pneumonia. In phthisis a friction murmur within a circumscribed space at the summit of the chest is a valuable diagnostic sign of the phthisical affection.

The diagnosis of the pleurisy is to be based on a pleural friction-murmur in connection with a localized stitch-pain occurring in connection with different pulmonary affections. It is not easy to determine how far the local and general symptoms are dependent on the pleurisy or on the pulmonary affections with which it is associated.

The treatment of circumscribed pleurisy embraces only the application of sinapisms, sometimes a blister or dry cups, and anodynes to relieve pain.

EMPYEMA.

Empyema or pyo-thorax is pleurisy with an accumulation of pus instead of a fibrino-serous liquid within the pleural space. It may be called suppurative pleurisy. The liquid, in cases of this variety, is either purulent from the first, or, as a rule, it is so not long after the attack. There is reason to presume that the disease is empyema and not a simple pleurisy, when the liquid progressively accumulates, when the temperature persists at 102° or over, when subcutaneous œdema exists over the affected side, and when the affection has followed acute pneumonia. It is not necessary, however, to rely on these diagnostic points. A little of the liquid may be withdrawn by means of a hypodermic syringe or a small aspirating needle, and its character determined. This is an innocent procedure, and may be at once resorted to with a view to the diagnosis.

Empyema, although generally acute at the outset, becomes chronic; it will be considered further in connection with chronic pleurisy.

PLEURISY WITH PNEUMO-THORAX.

Exclusive of cases in which an opening has been made through the walls of the chest, either accidentally or by thoracentesis, the presence of air in the pleural space denotes perforation of lung. The cases in which a perforation cannot be demonstrated after death are so few, that the question whether gas may not be developed by chemical changes in morbid products sufficient to give rise to the phenomena of pneumothorax, may practically be disregarded. Perforation from without inward, takes place in some cases of empyema. Taking place from within outward, it is not very infrequent in cases of phthisis. It is occasionally a result of circumscribed pulmonary gangrene, the sloughing process involving the pleura. It is a very rare event in other pathological connections. If empyema be excluded, and the affection have been preceded by a cough for a considerable period, with more or less emaciation, it is deemed certain evidence of the existence of phthisis.

Where life is not destroyed within a short time after the occurrence of pneumo-hydrothorax as it is called, the latter continues as a chronic affection. The diagnosis and treatment will be considered in connection with the chronic affections of the pleura.

EMBOLIC PNEUMONIA.

From a clinical standpoint, cases of embolic pneumonia may be divided into two groups.

In one group of cases the pulmonary affection is accompanied and preceded by symptoms denoting pyæmia, referable to accidental wounds, surgical operations, puerperal conditions, or to osteomyelitis, phlebitis, or suppurative inflammation in some internal organ. Minute emboli, derived from the veins of the affected part and charged with ichorous or putrescent matter, arrested in the branches of the pulmonary artery, excite a circumscribed pneumonia, which, if the life of the patient continue sufficiently, ends in suppuration, giving rise to the collections of pus which were formerly known as "metastatic abscesses." These patches of pneumonic inflammation, more or less numerous, and disseminated in both lungs, varying in size from that of a pea to a walnut, may not give rise to distinct physical signs. The diagnosis is to be based on, first, the existence of pyæmia which can be traced to a local origin, and, second, to disturbance of respiration out of proportion to the frequency of the pulse and the intensity of the pyæmic fever, together with more or less cough and expectoration, the latter being sometimes sanguinolent, and moist râles in different situations over the chest. In some instances the respiratory murmur and the vocal resonance may show circumscribed solidification of lung.

The indications for treatment relate to the pyæmia rather than to the pulmonary affection. They call for palliative, antipyretic, and supporting measures, and the prognosis is unfavorable.

In the other group of cases, the symptoms of pyæmia are either less marked or wanting. The source of the emboli may be within the heart, and the pneumonia may perhaps be due merely to the obstruction which they occasion. The pneumonia is circumscribed, and differs from lobar pneumonia in the tendency to suppuration and sometimes the occurrence of gangrene. The diagnostic symptoms are dyspnœa, localized pleuritic pain due to accompanying pleurisy, with, in some instances, pleuritic effusion, and mucous, muco-purulent, or bloody expectoration. The signs of solidification may be present within a circumscribed space. Following a chill or chills, there is more or less intensity of fever.

The situation of the embolic pneumonia in the majority of cases is in the posterior portion of the lower lobe, and generally in the right lung, the emboli passing usually into the right division of the pulmonary artery. The existence of cardiac lesions is to be taken into account in the diagnosis.

The affection in cases belonging to this group, presenting marked local symptoms and physical signs, together with considerable constitutional disturbance, involves great danger to life. The objects of treatment are palliation and support.

Hypostatic Pneumonia.

Hypostatic pneumonia is most conveniently noticed in this connection, although it can hardly be reckoned as a variety of acute pneumonic inflammation.

In typhus or typhoid fever and other diseases involving feebleness of the circulation, with recumbency on the back for a considerable period, passive congestion of the posterior portions of the lungs, from the gravitation of blood, is liable to occur. This sometimes leads to inflammation, usually of a low grade of intensity, and unattended with the exudation which characterizes acute lobar pneumonia. The posterior portions of both lungs are affected, but if circumstances have led to the patient keeping much of the time a position on one side, the affection is most marked on that side. Gradually extending from below upward, the greater part of the lower lobe of each lung may be in that condition of solidification which has been known as splenization.

Symptoms referable to this condition are increased frequency of the respirations, dyspnœa, cyanosis, cough, and muco-purulent expectoration. The last-named symptom denotes coexisting bronchitis which in some cases precedes the hypostatic condition. Febrile movement symptomatic of the affection is slight or wanting. The physical signs are notable dulness on percussion and feebleness of the respiratory murmur, with usually diminished vocal resonance and fremitus. If bronchitis coexist, mucous râles are liable to be present.

In treating cases of any disease which involves prolonged recumbency, it is important to recognize the liability to hypostatic congestion and pneumonic inflammation. The congestive condition may be prevented or remedied by preventing, if practicable, the patient from lying too constantly on the back. If the patient's strength permit, the body should be frequently raised to the sitting or half-recumbent posture, and voluntary forcible inspirations enjoined. The treatment otherwise consists of remedies to improve appetite and digestion, and to increase the power of the heart's action. Sitting up, as soon as the patient feels able, should be encouraged.

Fibrinous Bronchitis.

Of the numerous terms used to designate this affection, fibrinous bronchitis is adopted as the one least open to objections. As the name signifies, the affection is a bronchial inflammation characterized by the exudation of fibrin, forming a false membrane, on the inflamed surface. In this respect the affection is similar to the variety of inflammation of the larynx, known as fibrinous laryngitis or true croup. In cases of the latter affection, fibrinous exudation within the bronchial tubes not infrequently takes place. These cases are not included under the name fibrinous bronchitis. The affection designated by this name is unattended by a similar variety of laryngitis; the exudation is limited to the bronchial tubes. The affection is exceedingly rare. There are no diagnostic points relating to age, the circumstances of life, or appreciable causative influences. The larger proportion of cases are between ten and thirty years of age, and the affection occurs more frequently in men than in women.

The bronchial inflammation may be either acute or chronic. It is oftener chronic than acute. In either form, neither the symptoms, nor the physical signs warrant a diagnosis prior to the expulsion of fibrinous casts of the bronchial tubes. These are expectorated usually after violent and prolonged paroxysms of coughing. They may be expelled in small pieces, or casts representing a series of branches of the bronchial tree may be expectorated, rolled together in a mass, and covered with either mucus or muco-purulent matter. If the mass be placed in a liquid the branches can be separated and displayed, showing in some specimens the successive divisions from a bronchial tube of the third or fourth in the series to those of capillary size. The expulsion of the casts is sometimes preceded and followed by bloody expectoration.

In proportion to the extent of the obstruction caused by the exudation, the respirations are frequent, and there may be dyspnœa with cyanosis. Prior to the separation and expulsion of the casts, the cough is dry. In the acute affection, there is moderate fever and constitutional disturbance, as in cases of simple acute bronchitis. In chronic cases the fever is slight or wanting, and there may be very little general disorder.

The physical signs are mostly negative. The resonance on percussion is not diminished, and vocal resonance is unaffected. The respiratory murmur is weakened or suppressed over portions of the chest corresponding to the number and size of the bronchial tubes obstructed by the exudation. If the obstruction affect a considerable area on one side, there will be diminished expansion of the chest on that side with inspiration. Moist bronchial râles may, or may not be present. A vibratory or flapping râle has been observed, attributed to the movements of partially detached false membrane with the currents of air in the respiratory acts. These signs are not sufficiently distinctive for a positive diagnosis. Their significance is not apparent until after the expectoration of casts.

The bronchial obstruction may lead to collapse of pulmonary lobules and temporary emphysema. These conditions tend to obscure the diagnosis.

The acute affection has a duration not extending beyond a few weeks at farthest. The expulsion of casts is followed by immediate relief of the violent cough and embarrassment of breathing. The exudation, however, may be renewed. In a chronic form the affection may continue for months or years, casts being expectorated after variable intervals. In chronic cases there is little or no danger to life, but the acute affection ends fatally in a ratio of 50 per cent.

Fibrinous bronchitis is to be differentiated from thrombosis incident to bronchorrhagia. Casts resembling in their general appearance those formed by exuded fibrin, are sometimes the results of the coagulation of blood within the bronchial tubes. The latter follow hæmoptysis. They are not laminated like those formed by fibrinous exudation, and they contain blood corpuscles which in the latter are wanting.

If fibrinous bronchitis be diagnosticated, as it may be after casts have been expectorated, by signs and symptoms denoting a renewal of the bronchial obstruction, treatment having for its object the speedy separation and expectoration of the casts is indicated. The inhalation of warm vapor is perhaps the most effective of the means for this object. Vapor holding in solution lime and lactic acid has been thought useful by dissolving the fibrin. Emetics may sometimes be given with advantage in order to promote the expectoration of the casts. Riegel and other German authors recommend especially the muriate of apomorphia, as an appropriate emetic in consequence of the promptness of its operation, with but little nausea, and the absence of unpleasant after-effects.[1]

Aside from treatment having immediate reference to the removal of the casts, measures for the relief and cure of bronchitis are indicated. For these objects the iodide of potassium has been found especially useful.

BRONCHO-PNEUMONIA.

This affection, or rather this combination of affections, is known by other names, to wit, lobular pneumonia, bronchitis with collapse of pulmonary lobules, and catarrhal pneumonia. The last name is used by German writers and has been to some extent adopted in this country. Connected with the morbid conditions are certain pathological questions the discussion of which will not be here entered into. The term broncho-pneumonia implies the existence of pneumonic inflammation added to bronchitis. Bronchitis is undoubtedly the primary morbid condition. In connection with the bronchitis are nodules of solidified lung ranging in size from that of a pea to a filbert, more or less numerous, existing in both lungs, and situated chiefly in the posterior portions. It is certain that these nodules are collapsed lobules; but it seems also certain that in some of them there is evidence of intra-ventricular inflammation, and hence, the propriety of the term pneumonia. The pneumonic inflammation, however, does not give rise to the granular deposit within the vesicles, which is characteristic of lobar pneumonia. The collapse of lobules, and the lobular inflammation are secondary to, and dependent upon, the bronchitis.

---

[1] *Vide* Ziemssen's Cyclopædia, Am. edition, vol. iv. page 467.

In the diagnosis of broncho-pneumonia age is to be considered. The affection properly enough belongs among the diseases of childhood. In the great majority of cases the age is under five years. After infantile life, it occurs especially in those advanced in years. No age, however, is absolutely exempt from a liability to it.

The primary symptoms and signs are those of bronchitis. The bronchitis is not always capillary, but the pneumonic conditions are apt to occur in connection with capillary bronchitis, and, in cases of the latter affection, it is difficult, or, indeed, impossible always to determine during life whether it be or be not associated with these conditions. Practically, with reference to the treatment, this is not very important, provided the liability to the occurrence of the pneumonic conditions as incidental to the capillary bronchitis be recognized in the employment of therapeutical measures.

The respirations are frequent, there is suffering from dyspnœa, and cyanosis is marked in proportion as the respiratory function is compromised by the combined bronchial and pneumonic conditions. These symptoms are dependent on the bronchitis, in so far as the small tubes are involved, and on the pneumonic complication in proportion to the number and size of the nodules of solidification. The relative agency of these two factors in individual cases cannot be determined by the symptomatic phenomena. The physical signs afford information in relation to this point. The abundance and diffusion of subcrepitant râles constitute evidence of bronchitis seated in the small tubes. If these râles be few or wanting, the inference is that the local symptoms are not attributable directly to the bronchitis so much as to the solidification of pulmonary lobules. The coarseness of the bubbling râles which are usually present on both sides on the posterior inferior aspect of the chest, is thus evidence of the predominance of the pneumonic element as a factor in the production of the above-named symptoms.

If respiration be much embarrassed, the lower anterior portion of the chest is retracted, and there is depression above the clavicles with inspiration, as in cases of emphysema. The upper lobes, in fact, are more or less emphysematous, and the percussion-resonance over them may be vesiculo-tympanitic. Dulness on percussion over portions of the lower lobes will be marked if the solidified nodules be of considerable size or in close proximity to each other. Under these circumstances the respiratory sound may be bronchial or broncho-vesicular, and there may be bronchophony. The degree and extent of the solidification, as represented by these signs, sometimes vary from day to day accordingly as lobules are collapsed or expanded. This interesting fact the author has verified. When recovery takes place, the disappearance of the râles and the signs of solidification are sometimes rapid, with a corresponding improvement as regards the frequency of the respirations, the dyspnœa, and the cyanosis.

The expectoration, if the patient be old enough to expectorate, is more or less abundant and muco-purulent in character.

The acuteness of the affection varies much in different cases. In very acute cases the temperature is high, from 104° to 106°. The pulse is frequent, becoming, if the progress be unfavorable, small and weak, the characters representing weakness of the heart's action from an over-accumulation of blood in the right, and a deficient supply to the left, cavities. An unfavorable prognosis is to be based on these characters of the pulse, together with a high temperature, persistent cyanosis, and stupor from the retention of carbonic acid in the blood.

In a typical case under the author's observation, the patient being a feeble youth fourteen years of age, the following was the order of events: For several days cough and moderate expectoration, with a temperature of 101° to 102°, moist bronchial râles, neither coarse nor very fine, limited to the posterior aspect of the chest, and the resonance on percussion normal. Increased frequency of respirations and greater elevation of temperature, with dulness on percussion on both sides posteriorly, bronchial respiration and bronchophony, the auscultatory signs varying on different days in degree and extent, the moist râles persisting but with considerable variation in abundance, on different days, the foregoing symptoms and signs persisting for from two to three weeks. Rapid diminution of fever, the respirations returning to the normal frequency, cough and expectoration rapidly decreasing, and all the physical signs disappearing in the course of a few days, the improvement commencing with a craving appetite which was indulged without restriction, the patient, during the progress of improvement, taking four or five times the amount of solid food which he was accustomed to take in health, and without any evidence of indigestion. Complete recovery, the duration of the affection being about a month.

The treatment of broncho-pneumonia embraces measures relating to the bronchitis and the collapse of pulmonary lobules.

As regards the former, the treatment consists in the administration of the iodide of potassium, the chlorate of potassa, and the hydrochlorate of ammonia. The inhalation of warm vapor is especially useful by promoting resolution, and facilitating expectoration. The best method is to charge the atmosphere of the sick-room with steam from water, in large open vessels, kept at the point of ebullition.

Emetics may be called for in young children in order to free the bronchial tubes from an accumulation of muco-purulent secretions.

To prevent collapse, and to effect the expansion of lobules already collapsed, measures to promote forcible acts of inspiration are indicated. Juergensen recommends for this end cold affusions following baths of moderate temperature. The baths should be of a temperature of from 77° to 86°, and are to be continued about twenty minutes. On coming out of the bath, from ten to twenty quarts of water should be poured over the neck, back, and breast, the water being a few degrees above the freezing point. This author states that a stream of water not more than a third of an inch in thickness, directed against the back of the head, over the medulla oblongata, will produce violent respiratory efforts.

If the fever be intense, that is, the temperature being from 103° to 105°, antipyretic treatment should be employed, namely, full doses of quinia or the cold bath.

To maintain the power of the heart's action, alcoholic stimulants are important whenever the characters of the pulse and the heart-sounds show notable feebleness. Alimentation is also important, as in all affections in which there is danger in the direction of cardiac weakness or failure of the vital powers. The dietetic maxims that there cannot be an over-digestion of food, and that far more harm may arise from insufficient alimentation than from over-ingestion, are to be kept in mind.

EPIDEMIC BRONCHITIS.

This affection is placed among the local affections in conformity with custom and for convenience. It is an essential fever, of which the inflammation of the air passages is the local expression. Its proper nosological place, therefore, is among the general or constitutional diseases. Influenza, a name which is significant of its epidemic diffusion and its dependence upon a special cause in the atmosphere, is more commonly used than epidemic bronchitis.

Aside from its prevalence as an epidemic, the differential points, as contrasted with sporadic bronchitis, are as follows: It not infrequently commences with a well-pronounced chill. The nasal passages, the conjunctival membrane, the pharynx, and the larynx are more constantly, and in a greater degree, affected. There is notably greater fever, with pain in head, back, and limbs, loss of appetite, and general debility. The liability to pulmonary complications, namely, capillary bronchitis and pneumonia, is an important differential point.

The treatment varies according to the age of the patient, and the condition as regards feebleness of constitution, or the existence of other affections. In healthy adults pretty free purgation with saline cathartics affords marked relief. Since the efficacy of free doses of quinia in arresting or favorably modifying pneumonia and simple acute bronchitis has been established, the author has not had an opportunity of making trial of this treatment in cases of influenza. At the commencement of the affection opiates and diaphoretics have a favorable effect.

Infants, the aged, and feeble persons require careful treatment, with a view to prevent the complications which may render the affection fatal. Depressing or debilitating measures are to be avoided. The indications when complications occur, are essentially the same as when these are developed in other connections.

PERTUSSIS—WHOOPING-COUGH.

This affection may be included among the varieties of acute bronchitis, although its distinctive pathological and diagnostic features relate to the nervous system. It is a contagious affection belonging among the diseases of children, but rarely affecting infants prior to weaning. In the great majority of cases the patients are under five years of age. It may occur, however, at any period of life, cases being occasionally observed in those who are advanced in years.

The diagnosis is easy enough when its characteristic features are well marked. These are so distinctive that the affection is easily recognized by non-medical observers. The diagnostic characters relate to the paroxysms of coughing. A paroxysm consists of a series of spasmodic coughing efforts following in such quick succession that inspiration is impossible, and at length when an inspiratory act takes place it is slow, and, from spasm of the glottis, accompanied by a whooping sound. This sound renders the popular name, whooping-cough, significant. The expulsion of air with the coughing efforts gives rise to an intense feeling of breathlessness. The blood accumulates in the right cavities of the heart, and this occasions notable congestion of the face, with fulness of the veins, and frequently, resulting therefrom, hemorrhage from the nostrils. Vomiting is a very frequent concomitant. The paroxysms vary in severity in different cases, and also as regards their recurrence. They are sometimes comparatively mild and few in number. In extremely severe cases there may be seventy, eighty, or even a hundred in the twenty-four hours. They occur more frequently in the night than during the day. They appear sometimes to be determined by physical exertions or mental excitement, but they often occur without any apparent exciting causes.

The paroxysms may be wanting, and the diagnosis is then to be based on the continuance of cough for a period corresponding to the duration of the disease, other members of the same family being affected, and its being known that the patient has not previously had it. Prof. J. Lewis Smith has reported two such instances.[1] On the other hand, this is one of the diseases which may be simulated from imitation, so that the characteristic paroxysms do not constitute absolute proof of the existence of the affection.

The paroxysms are preceded by coryza and bronchitis for a period varying from eight to fifteen days. During this prodromic period a positive diagnosis cannot be based on the distinctive neuropathic characters of the affection. The cough, however, is usually more spasmodic than would be expected from an ordinary "cold," and its continuance is unduly long. These circumstances, taken in connection with known exposure to the specific cause, or the fact that other members of the family have been affected, warrant a probable diagnosis, which is confirmed when the "whoop" is once heard.

There is ample time after the commencement of cough, and prior to the characteristic paroxysms, for abortive treatment, but successful means for this end have not as yet been established; nor are there any known measures which can be depended upon for an arrest of the disease after the paroxysmal or spasmodic stage has been reached. The measures which often succeed in cutting short a simple bronchitis are not effectual. To render the disease abortive, the special cause, which is a contagious miasm, must be either destroyed, neutralized, or eliminated from the system. Effective treatment in these directions is yet to be discovered.

The duration of the disease may be abridged by treatment. Of curative measures, the employment of belladonna or of its alkaloid atropia, is, with our present knowledge, the most reliable. Brown-Séquard states that by giving atropia in doses sufficient to produce marked toxical effects, the duration may be diminished to a few days. Clinical facts sufficient to establish this statement have not been reported, but there is abundant testimony in behalf of a certain amount of controlling influence exerted by these remedies. Belladonna is the safer remedy. It should be given in doses sufficient to produce dryness of the throat and an efflorescence on the skin. Prof. J. Lewis Smith, whose experience has been large, and whose observations are trustworthy, advises its employment as follows: Of the tincture of belladonna, to a child two years of age, three drops, and to one of six or eight years, ten drops may be given morning and evening. The symptoms improve when the rash is produced. This treatment, as he states, will curtail the disease to four weeks, dating from the commencement of the cough. The salts of quinia, in small doses at short intervals, appear to have a modifying effect.

---

[1] Diseases of Infancy and Childhood.

The hydrocyanic acid modifies favorably the disease in a certain proportion of cases. The use of this remedy, however, requires great care, and in young children its employment is of doubtful expediency. To a child nine years of age or more, half a minim may be given every four hours.

The bromides have been found useful; but these, as well as the hydrocyanic acid, are inferior to the belladonna.

To abridge the duration of the disease is desirable in order to diminish the liability to complications in which consist the danger, namely, capillary bronchitis and pneumonia.

Various remedies are useful in lessening the severity of the paroxysms. The hydrate of chloral has been given with benefit as a palliative; but it includes a risk of dangerous effects, and this should preclude its employment. The same statement will apply to inhalations of chloroform. Anti-spasmodic remedies, namely, musk, castor, assafœtida, the oxide of zinc, the ethers, conium, hyoscyamus, and the monobromide of camphor, are not open to objections on the score of danger, and are useful as palliatives. Coffee is to be included among the palliative remedies.

The mixture of cochineal and the carbonate of potassa, which has long been in use as a remedy in this country, probably has little if any influence over the disease.

Breathing an atmosphere charged with the fumes emitted in the purification of coal-gas, has been found in some instances to afford relief, and in other instances without any good effect.

Dr. S. D. Powell, of New York, has reported five cases in which complete anæsthesia produced by the inhalation of sulphuric ether, and maintained for a period varying from fifteen to fifty minutes, appeared to arrest the disease. The anæsthesia was produced in two of the cases but once, in two cases twice, and in one case three times. The ages of the patients were between two and nine years. The number of the cases is too few to draw inferences as to the value of this treatment, and in all the cases the disease had existed for several weeks. Moreover, there may be some danger in this treatment, especially in patients under two years of age.[1]

---

[1] *Vide* Journal of Nervous and Mental Disease, New York, April, 1876.

In a paper read before the New York State Medical Society in June, 1877, Dr. George Bayles reports ten cases in which the inhalation of the nitrite of amyl, at the instant a paroxysm occurred, arrested the paroxysm and cut short the affection. In infants a single minim suffices. Children from three to ten years of age may inhale from two to three minims. Quinine was given in each of these cases, the doses repeated hourly.[1]

Hygienic measures form an important part of the treatment of whooping-cough. If the bronchitis which accompanies the disease be not severe, and there be no inflammatory complication, the patient should not be kept within doors. Change of air has often a very happy effect. Daily sponging of the body with cool water followed by brisk friction is useful. Invigoration is the object of these measures. The diet should be abundant and nutritious. If the appetite or digestion be impaired, tonic remedies are indicated. The vomiting which accompanies the paroxysms is apt to occasion anæmia; hence, the usefulness of chalybeate tonics.

SUMMER AND AUTUMNAL BRONCHITIS (HAY FEVER, HAY ASTHMA).

With reference to diagnosis and treatment, certain facts concerning the etiology of this affection are to be considered. It requires an idiosyncrasy which in some instances is inherited. The idiosyncrasy consists in a peculiar susceptibility, in consequence of which certain causes in the atmosphere excite an inflammatory condition of the air passages, frequently giving rise to paroxysms of asthma, these atmospherical causes being innocuous to those not having this idiosyncrasy. The causes are present in the atmosphere only during certain periods of the year, for the most part in the summer or autumnal months, that is, either in May and June, or in August and September; hence, the significance of the names summer and autumnal bronchitis. The great majority of cases occur during these periods. It seems to be pretty clearly established that the causes are the pollen of grasses and other plants. The idiosyncrasy is analogous to that which renders some persons susceptible to powdered ipecacuanha, emanations from feathers, and other well-known causes of bronchitis and asthma.[2]

The names summer and autumnal bronchitis call for an explanation. The name hay fever is inappropriate, in the first place, because the causes are by no means exclusively emanations from hay, and in the second place, the affection is not an essential fever, whatever febrile movement may exist being symptomatic of the local conditions. Hay asthma is not an appropriate name, inasmuch as asthmatic paroxysms occur in only a certain proportion of cases. The names summer and autumnal catarrh are not adopted, from a conviction that it is desirable to avoid the word catarrh in all connections. The symptoms of the affection seem to denote an inflammatory condition of the bronchial mucous membrane in many, if not most, cases, and this condition is sometimes, at least, acute; hence, it is considered not inappropriate to include the affection among the varieties of acute bronchitis.

---

[1] *Vide* Virginia Medical Monthly, August, 1877.

[2] For further facts relating to etiology, the reader is referred to the work on Autumnal Catarrh by Morrill Wyman, M.D.; to a treatise on Hay Fever or Summer Catarrh by George M. Beard, M.D., and to the article on this affection in Ziemssen's Cyclopædia, vol. ii.

The diagnosis is doubtful only when the affection is experienced for the first time. In other cases the periodical recurrence in the past experience of the patient is sufficient, taken in connection with the symptomatic phenomena.

The clinical history, however, has features distinguishing it from a simple bronchitis, and the differential diagnosis is limited to this disease. The bronchial affection, as in common "colds," is preceded by coryza. This is generally accompanied by frequent sneezing, and by a copious discharge of a serous liquid. The conjunctiva is reddened, and there is abundant lachrymation. These symptoms have not an uniform intensity, but they either occur in paroxysms, or there are marked exacerbations. The throat becomes inflamed, with often more or less swelling of the tonsils. A peculiarity is the occurrence of paroxysms or exacerbations of sneezing and lachrymation at irregular intervals, and their abrupt termination. They are most apt to occur when the patient is in the open air. Cough follows, and is more or less frequent and violent, accompanied generally with but little expectoration. Paroxysms of asthma follow the cough in a certain proportion of cases, different cases differing much in respect of their frequency, severity, and duration. The fever which exists is not intense, and is evidently symptomatic, not essential. All the symptoms are aggravated by exercise out of doors. The histories of cases show very conclusively the local effects of extrinsic causes acting first upon the nasal passages, and successively upon the pharynx, larynx, trachea, and the bronchial divisions, extending frequently to the tubes of small size, producing in the latter spasm of the muscular fibres, but not the phenomena of capillary bronchitis.

The affection is mitigated by numerous remedies, namely, quinia, belladonna, opium, the iodide of potassium, etc. Remedies are only palliative so long as the causes are in operation. Assuming the causes to be the pollen of blooming grasses and other plants, as long as these are suspended in the atmosphere which patients breathe, the affection continues; the symptoms are severe, other things being equal, in proportion to the quantity of the noxious agents which the atmosphere contains, and when they are no longer contained in the inspired breath, the affection ends.

The effectual method of bringing the affection promptly to an end, is for the patient to avoid the causes by going to a situation where they are not present in the atmosphere. The required period of absence is generally only a few weeks. The same situation will not suit all cases. Evidently different varieties of pollen produce the affection in different persons, certain varieties producing it in some and not in others; hence one patient may be free from the malady in a situation in which another patient continues to suffer from it. The proper place for each case is to be ascertained by individual experience. Many patients in this country find a sojourn in the White Mountains effectual. For some it answers to go to the seaside, or to an island distant some miles from the coast. Fire Island is a place of resort for patients who suffer from this affection. Dr. Ashhurst from his personal experience and that of others, recommends Beach Haven, a sandy island on the coast of New Jersey.[1] The affection is extremely rare on the continent of Europe, and many combine with prophylaxis the pleasures of a foreign tour. On the sea, shortly after the commencement of the voyage, the malady always disappears.

If the foregoing method of prevention and management be not practicable, the alternative is to keep within doors as much as possible while the affection continues. The experience in each case must determine which of the various palliative remedies is most serviceable.

II.

CHRONIC INFLAMMATORY DISEASES OF THE RESPIRATORY ORGANS WITHIN THE CHEST.

CHRONIC SIMPLE PLEURISY, EMPYEMA, PLEURISY WITH PNEUMO-THORAX.

Chronic inflammation of the pleura gives rise to three affections, namely, chronic simple pleurisy with effusion, empyema or pyothorax, and pleurisy with pneumo-thorax. The last-named affection is distinguished as either pneumo-hydrothorax or pneumo-pyothorax, the liquid in the former being sero-fibrinous, and in the latter purulent. These affections will be considered collectively with reference to diagnostic symptoms, physical signs, and treatment.

Chronic pneumonia is of two kinds, namely, pneumonic phthisis, or the ordinary form of pulmonary consumption, and interstitial pneumonia, or fibroid phthisis. These, together with acute miliary tuberculosis, will be considered separately.

In chronic bronchitis the inflammation is limited to the bronchial tubes of either large or medium size. Capillary bronchitis does not occur as a chronic affection.

Diagnostic Symptoms.

Prodromic Events.—The events which precede simple pleurisy and empyema afford some points which bear upon the differential diagnosis. Both may follow acute pleurisy; but in empyema this is the rule, whereas, in simple pleurisy, it is true of only a certain proportion of cases. In chronic pleurisy, therefore, whenever the inflammation was subacute at the beginning, the chances are much in favor of its being simple, that is, sero-fibrinous. If the pleurisy be a sequel of pneumonia, it is generally, if not invariably, purulent. If an effusion occur in the course of phthisis, it is generally sero-fibrinous. The antecedent events in cases of pleurisy with pneumo-thorax have a decided bearing on the diagnosis. Exclusive of traumatic cases, this affection is incident to phthisis in the great majority of cases. In a small proportion of cases it occurs in connection with empyema, perforation of lung taking place from without inward. In a still smaller proportion of cases it is incidental to gangrene of lung, and is then preceded by the symptoms and signs of that affection. Eliminating antecedent gangrene and empyema, pleurisy with pneumo-thorax affords always presumptive evidence of the existence of phthisis.

---

[1] *Vide* Am. Journ. of Med. Sciences, April, 1877.

Local Symptoms.

Pain.—If either chronic simple pleurisy or empyema have been preceded by acute pleuritic inflammation, the pain attending the latter has either ceased or become comparatively slight. If the inflammation be subacute from the beginning, pain is rarely prominent, and is not infrequently wanting. The absence of pleuritic pain is thus by no means proof against the existence of these affections.

In cases of pleurisy with pneumo-thorax, the latter being dependent on perforation of lung, pain at the outset is a pretty constant symptom, and it is often severe. Its occurrence is coincident with the perforation when this is from within outward. When, however, the perforation is from without inward, as it is in cases of empyema, it may occasion no pain. Pain is sometimes wanting when perforation occurs in connection with either phthisis or gangrene.

Cough and Expectoration.—In chronic simple pleurisy and empyema, cough is rarely, although sometimes, wanting. The cough is not violent. It is a short, hacking cough, provided the pleurisy be not an intercurrent affection in phthisis or some other pulmonary disease. The expectoration, with the same provision, is either wanting or small, and is mucous in character, not purulent nor muco-purulent.

In pleurisy with pneumo-thorax occurring in connection with phthisis, there is more or less cough and expectoration due to the phthisical affection. So when the disease is caused by perforation in cases of pulmonary gangrene, cough and the characteristic sputa precede and accompany the pleurisy. When perforation of the lung takes place in empyema there is a copious expectoration of pure pus. This is highly diagnostic of pneumo-pyothorax, assuming that the existence of empyema was known. A copious expectoration of pus, however, takes place in pulmonary abscess, and also when a collection of pus in the liver is evacuated through the bronchial tubes.

Respiration and Dyspnœa.—In simple chronic pleurisy and empyema, the frequency of the respirations is increased, other things being equal, in proportion to the quantity of liquid within the chest. The accumulation of liquid in general is not sufficiently rapid to occasion at an early period notable increase in frequency and dyspnœa. If the lung on the unaffected side be healthy, even when the quantity of liquid is sufficient to compress the lung into a solid mass and dilate the chest, although the respirations are frequent, thirty or more per minute, the patient often does not suffer from dyspnœa when at rest. Any exertion causes an additional increase in frequency of respirations, and gives rise to more or less distress from a sense of the want of breath. If dyspnœa be present, the prolabia show lividity or cyanosis. Diseases on the unaffected side, cardiac lesions, and anæmia lessen tolerance of the suppression of the function of one lung.

In most cases of pleurisy with pneumo-thorax, great dyspnœa with rapid breathing follows shortly or immediately the occurrence of perforation of lung, the affection offering a contrast in this respect to the early period of simple pleurisy and empyema. The symptoms in twenty-four or forty-eight hours diminish, tolerance of the conditions having been acquired, and afterward the rule is the same as in the other affections, namely, the frequency of respiration and dyspnœa, other things being equal, are in correspondence with the degree of compression of lung by the presence of liquid and air. The statement as to the symptoms which generally follow directly perforation of lung, applies only to cases in which the perforation is from within outward. When perforation takes place in empyema the effect is the reverse, that is, the frequency of respirations becomes less, and dyspnœa, if it have existed, is relieved. Exceptionally, perforation takes place in cases of phthisis, without notable disturbance of respiration. The inference in these exceptional cases is that the perforation is small, or that the communication between the bronchial tubes and the pleural cavity is obstructed so that air and morbid products pass slowly into the pleural space.

Physical Signs.

Inspection.—In chronic simple pleurisy and in empyema, the quantity of liquid is often sufficient not only to compress the lung into a solid mass, but to occasion considerable dilatation of the affected side of the chest. The signs on inspection are then marked. The enlargement is apparent to the eye. The intercostal spaces are on a level with the ribs or even bulging, and present, if the patient be thin, a striking contrast to the opposite side. The respiratory movements of the affected side are slight or *nil*, those on the healthy side being increased.

These appearances may be equally marked in cases of pleurisy with pneumo-thorax.

With a less quantity of liquid in simple pleurisy and empyema, or of liquid and air in pleurisy with pneumo-thorax, inspection shows only more or less disparity in the respiratory movements between the two sides.

Percussion.—In chronic simple pleurisy, and in empyema, if the affected side of the chest be filled with liquid, there is universal flatness on percussion, as in some cases of acute pleurisy. If the quantity of liquid be sufficient to supplant the lung partially, the signs attained by percussion are the same as in similar conditions in the acute form. For these the reader is referred to page 83.

Pleurisy with pneumo-thorax offers a marked contrast as regards the signs obtained by percussion. The resonance above the level of the liquid is purely tympanitic, with, in some instances, an amphoric quality. Below the level of the liquid there is either dulness, or, if the quantity of liquid be considerable, flatness. The level of the liquid is not accurately indicated by the line which divides tympanitic resonance and either dulness or flatness. The liquid always rises above this line. If the quantity of liquid be small, the tympanitic resonance may extend quite to the base of the chest; in other words, the liquid gives rise to neither flatness nor dulness. If there be flatness or dulness, as there is in the vast majority of cases, the upper boundary, when the patient is sitting or standing, is a horizontal line on either the anterior, the lateral, or the posterior aspect of the chest; and this always changes to an oblique line on a recumbent position of the body.

Auscultation.—When the liquid in chronic simple pleurisy, and in empyema, occupies only a part of the pleural space, the auscultatory signs are the same as in cases of acute pleurisy (*vide* page 84). Over the affected side, if the liquid be sufficient to fill the pleural space and compress the lung into a solid mass, there is absence of vesicular murmur. An exception to this statement is when, in some cases, the vesicular murmur on the healthy side is transmitted laterally more or less over the affected side. At the summit there is often bronchial respiration over the site of the compressed lung which is usually situated in the upper and posterior portion of the chest. This bronchial respiration is sometimes transmitted over more or less, and it may be over the whole, of the affected side, especially in children. Bronchophony is also often present over the compressed lung. Ægophony is sometimes, but very rarely, present. Elsewhere than over the compressed lung on the affected side, vocal resonance is either notably weakened or wanting.

Pleurisy with pneumo-thorax offers the same signs as regards the respiratory murmur and vocal resonance. But in this affection there are often present respiratory signs which are wanting in the other affections, namely, amphoric respiration and voice with metallic tinkling. These are distinctive, and in connection with the signs obtained by percussion establish the diagnosis.

In each of these affections, if the chest be dilated, the heart is removed from the præcordia. Its situation may be determined by finding the point at which the heart sounds are heard with the maximum of intensity.

Palpation.—The vocal fremitus is either diminished or abolished in simple pleurisy and in empyema, over the space occupied by liquid, and, in pleurisy with pneumo-thorax, over the space occupied by liquid and air. The dislocation of the heart, which takes place when the quantity of liquid, or liquid and air, is large, is generally ascertained by palpation.

Mensuration.—The diminished respiratory movements of respiration, and the dilatation of the affected side, caused by liquid in simple pleurisy or in empyema, and over the space occupied by air and liquid in pleurisy with pneumo-thorax, may be determined by either semicircular measurement by means of tape, or by diametrical measurement with callipers.

Succussion.—This method furnishes no sign in cases of simple pleurisy and in empyema. In pleurisy with pneumo-thorax it furnishes a pathognomonic sign, namely, the succussion sound or splashing. With very rare exceptions, by means of this sign the diagnosis may be made in an instant.

Exploratory Puncture of the Chest.—In order to demonstrate the presence of liquid in the pleural space, and to determine the character of the liquid, a small hollow needle or trocar may be introduced. This gives but little pain, and is not followed by any unpleasant effects. It is therefore warrantable with reference to the diagnostic points just named.

The presence of liquid is determinable almost with certainty by the physical signs which have been stated. To differentiate this condition from solidification of lung is very rarely difficult. A carcinomatous tumor filling the chest on one side, or infiltrating the lung, and accompanied with more or less pleuritic effusion, may present physical signs identical with those in cases of simple chronic pleurisy or empyema, with dilatation of the affected side. Instances of this kind have fallen under the author's observation. An exploratory puncture may show the presence of liquid, which is generally sero-fibrinous. If the fluid be withdrawn by aspiration, the affected side remains dilated, with flatness on percussion, and absence of respiratory murmur, and perhaps loss of vocal resonance and fremitus. The needle or trocar again introduced fails to show the presence of liquid. To make sure of the absence of liquid, exploratory punctures may be made at different points. In this way the diagnosis is established.

Exploratory punctures are advisable to determine whether the liquid be sero-fibrinous or purulent, that is, to differentiate empyema from chronic simple pleurisy. A few drops of the liquid suffice for this object. The result of the exploration, as will presently be seen, has an important bearing on the treatment. In pleurisy with pneumo-thorax, it is desirable to know whether the liquid be sero-fibrinous or purulent; in other words, whether the affection be pneumo-hydrothorax or pneumo-pyothorax. This question may be settled instantly by the withdrawal of a few drops of the liquid. It has been the custom in this city to use the common hypodermic syringe for this exploratory puncture. There is, however, some danger of the needle breaking and leaving a portion within the chest. Several instances of this accident have fallen within the author's knowledge. This is to be guarded against by using a needle somewhat larger, and which will not be liable to fracture. The best plan is to use a small trocar, by means of which aspiration may be at once resorted to if deemed advisable.

General Symptoms.

The physical signs by which these three affections may be differentiated, including an exploratory puncture of the chest, are so conclusive and readily available, that the general symptoms hardly claim attention as affording diagnostic points. Suffice it to say that a persistent temperature of the body at 102° or 103°, implies the presence of a purulent liquid, and that the general, as well as local symptoms of phthisis taken in connection with the sudden occurrence of pleuritic pain and notable disturbance of respiration, together with a considerable rise of temperature, frequency of the pulse, and prostration, point to perforation which has given rise to pleurisy with pneumo-thorax.

VARIETIES OF CHRONIC PLEURISY, EMPYEMA, AND PLEURISY WITH PNEUMO-THORAX.

Bilateral Pleurisy — Hemorrhagic Pleurisy — Circumscribed Empyema—Empyema with Spontaneous Perforation of Chest-wall—Circumscribed Pleurisy with Pneumo-thorax.

BILATERAL PLEURISY.

Pleurisy with effusion in both sides of the chest is to be distinguished from hydrothorax, a purely dropsical affection in which the effusion is always bilateral with the exception of cases in which universal, old pleuritic adhesions exist on one side. Under the latter circumstances there may be pleuritic effusion on one side and pulmonary œdema, taking the place of pleuritic effusion, on the other side. An instance of this kind has fallen under the author's observation. Hydrothorax is always associated with general dropsy, dependent, in the vast majority of cases, on disease of either the heart or kidneys (cardiac and renal dropsy). The absence of general dropsy is therefore sufficient to exclude hydrothorax, and, if this be excluded, the affection is double pleurisy.

A bilateral pleurisy with effusion is almost conclusive as regards the existence of phthisis.

HEMORRHAGIC PLEURISY.

The pleuritic effusion in some cases of pleurisy contains blood. The cases are rare. A bloody effusion occurs if pleurisy be a complication of purpura hæmorrhagica. The hemorrhage may proceed from newly organized false membrane. It occurs irrespective of these conditions, and is to be considered as evidence of tuberculous or malignant disease.

CIRCUMSCRIBED EMPYEMA.

A purulent liquid is sometimes confined within a portion of the pleural space, its diffusion being prevented by pleuritic adhesions on all sides. Generally this follows an empyema in which at first the pus was not localized. It occurs when a fistulous opening through the chest-wall is made, adhesions taking place as the lung expands. In the progress toward recovery, the pleuritic abscess, as it may be called, diminishes more and more, until, at length, the pleuritic surfaces become completely adherent.

A circumscribed empyema, however, may occur when old adhesions existed prior to the accumulation of pus; or a local cause may have excited adhesive pleuritic inflammation prior to the collection of pus.

In a case which came under the author's observation, empyema, circumscribed from the first, resulted from necrosis of the spine, the pus, removed by aspiration, emitting an intensely fetid odor.

EMPYEMA WITH SPONTANEOUS PERFORATION OF THE CHEST-WALL.

Cases in which perforation of the chest wall takes place spontaneously are not infrequent. Almost invariably the liquid is purulent, but the author has known spontaneous perforation to occur when the liquid was sero-fibrinous. After the perforation of the chest-wall, the liquid, accumulating beneath the skin, produces a soft, fluctuating tumor. This tumor sometimes pulsates strongly (pulsating empyema), and it is to be distinguished from aneurism. The author has known such a pulsating tumor to present itself in the second intercostal space, to the right of the sternum, where an aortic aneurism is most frequently situated, and also on the posterior aspect of the chest near the site of the descending aorta.

In these cases, the physical signs show the chest on one side to be filled with liquid. Aspiration, performed at a point more or less removed from the tumor, causes the latter immediately to disappear.

CIRCUMSCRIBED PLEURISY WITH PNEUMO-THORAX.

Liquid and air may occupy only a portion of the pleural cavity, owing to firm adhesions bounding the space occupied. Under these circumstances, a succussion sound may not be available for the diagnosis; and, inasmuch as tympanitic resonance on percussion with amphoric auscultatory sounds are not infrequently signs of a pulmonary cavity, pneumothorax is to be differentiated from the latter. The tympanitic resonance is likely to be more marked than when it proceeds from air in pulmonary cavities, and the intercostal spaces may be pushed outward. An exploratory puncture may be made, but this will not furnish demonstrative proof that air and liquid are in the pleural space, for a pulmonary cavity situated very near the surface of the lung is easily penetrated by the exploring needle or trocar. The previous history, together with the associated symptoms and signs, is to be considered in making a diagnosis.

TREATMENT OF CHRONIC SIMPLE PLEURISY.

If the quantity of liquid effusion be sufficient to dilate the chest ana occasion embarrassment of breathing, aspiration should be resorted to without delay. Elaterium, or other active hydragogues, will often diminish the quantity of liquid and afford relief; but their operation is not as prompt as aspiration, and the latter is certainly quite as innocuous. The operation is so simple and so rarely attended by any unpleasant consequences, that at Bellevue Hospital it is now resorted to, as a matter of course, whenever a patient suffers from an accumulation of liquid. The adaptation of the stomach pump, as used by Bowditch, or any of the more recent aspirators, may be employed, provided that, instead of the aspirating needles, a trocar be used to puncture the chest. A trocar with a stopcock, and an adjustment to be attached to a common Davidson's syringe, answers every practical purpose. This the author has employed in a large number of cases. An aspirating apparatus may be extemporized by using an ordinary trocar and a Davidson's syringe, the latter now being in almost every household. The liquid should be removed very slowly. This rule the author has inculcated for many years. The withdrawal of the liquid should be discontinued as soon as a troublesome cough occurs or a sense of distress is felt. These are the only important practical injunctions. A prompt resort to aspiration is followed by full expansion of the lung, and subsequent contraction of the chest is thereby prevented.

If the quantity of liquid be not sufficient to occasion embarrassment of breathing, measures for promoting absorption may be tried. These measures are mild hydragogues, diuretics, a series of small blisters, and the external application of iodine. Should these measures not prove speedily successful, the liquid should be removed by aspiration.

Tonic remedies, a nutritious diet, the judicious use of wine, the open air, and other measures to invigorate the system, form an important part of the treatment.

The treatment may be expected to prove successful if the pleurisy be not a complication of phthisis or other pulmonary disease, and the general condition of health be fair.

The patient should be instructed not to take violent muscular exercise for some time after convalescence, in order to avoid rupture of recent adhesions, which may give rise to intrapleural hemorrhage.

TREATMENT OF EMPYEMA.

As soon as practicable after the liquid is found to be purulent, it should be removed by aspiration. Aspirating very slowly, the object should be to remove all the pus. In a very small proportion of cases, pus does not reaccumulate, and the aspiration effects a cure. If the pus reaccumulate, a free opening should be made at the bottom of the chest. The opening is to be made fistulous by tents. This is preferable to the introduction of a drainage tube which excites irritation, and is liable to be broken, a portion remaining within the chest—an accident which has occurred within the author's knowledge. A sufficiently large opening for the ready escape of pus should be maintained, and the cavity of the pleura washed out daily with tepid water, to which is added a little carbolic acid. Sometimes the injection may be made with advantage twice daily. The good effect is shown by the fact that, if omitted, the temperature rises, falling as soon as the injections are resumed. The author has observed repeated illustrations of this fact.

In addition to the local treatment, sustaining and invigorating measures are indicated.

Recovery may be expected provided there be no other important affection, and the general condition of the patient be fair. More or less discharge of pus, however, in some cases, continues for months and even years. In a hospital case under observation, the patient being advanced in years and having a feeble constitution, a fistulous opening has been maintained for two years, and a small quantity of pus is still removed by the daily injections, improvement in the general condition being slowly progressive.

The foregoing treatment is applicable to cases of circumscribed empyema, and empyema with spontaneous perforation of the chest wall. If the spontaneous perforation have not taken place near the lower part of the chest, it is not sufficient to open the subcutaneous tumor, but thoracentesis should be performed in a more favorable situation.

It is proper to state that cases have been reported in which grave symptoms and death have followed the removal of liquid by aspiration from the pleural cavity, and, also, after washing out the chest in cases of empyema in which a permanent opening has been made. No instance has occurred in the author's experience, which has been considerable, nor in the much larger experience of Bowditch. The probable explanation of the occasional alarming and fatal effect, is the dislodgment of thrombi formed in the pulmonary veins due to the pressure of the liquid prior to the thoracentesis.[1]

TREATMENT OF PLEURISY WITH PNEUMO-THORAX.

The treatment in cases of empyema which become cases of pyo-pneumo-thorax, from perforation of the lung, is essentially the same as if perforation had not occurred. There should be no delay in establishing a fistulous opening into the chest. When this is done, the passage of pus into the bronchial tubes will be likely to cease. This treatment may be resorted to with success under circumstances which seem to render the condition of the patient almost hopeless. The author has reported a case which exemplifies this statement, the main facts being as follows: On July 3d, 1873, the patient, a laboring man aged 33 years, was extremely feeble and emaciated. The pulse varied from 110 to 120 per minute. The fingers were notably bulbous. The axillary temperature varied from 101° to 103°. On the previous day he had expectorated over thirty ounces of pus. There was flatness on percussion over the right side of the chest, with absence of respiration, vocal resonance, and fremitus. Succussion showed the presence of air and liquid. The suffering from dyspnœa was great. A free opening into the chest was made with no expectation of benefit beyond temporary relief. Through the opening sixty-eight ounces of creamy pus escaped. On the next day fourteen ounces were removed by means of a catheter introduced into the opening, and on July 5th five ounces in the same way. July 7th thirty-two ounces were removed. After this date the tent was withdrawn, and the pleural cavity injected daily with tepid water, to which was added a little carbolic acid. On the 14th July the expectoration had ceased, and the general improvement was marked. July 31st, there being no discharge of pus through the opening, the injections were discontinued. He had on this date gained considerably in weight. From this date to Sept. 8th he gained sixteen pounds in weight. The opening had closed. The expectoration was slight. His aspect was healthy, and he reported well enough to leave the hospital. There was slight dulness on percussion over the right side of the chest, with feeble respiratory murmur and some moist râles at the base. This side was considerably contracted.[1]

---

[1] For illustrative cases, *vide* Trans. Clinical Society of London, vol. x. 1877.

Pleurisy with pneumo-thorax following circumscribed gangrene of the lung, in the author's experience, has terminated fatally within a short period, offering no encouragement in the way of successful treatment.

In an analysis of about seven hundred cases of phthisis recorded by the author, perforation followed by pleurisy and pneumo-thorax occurred in a proportion of three and a half per cent. Although this percentage is small, phthisis is so common that instances are not very infrequent. The indications directly after perforation are generally to relieve dyspnœa by the judicious use of opiates, and to sustain the action of the heart by ethereal and alcoholic stimulants. Puncture of the chest to allow the exit of air is warrantable as a palliative measure. It affords relief, and, with a view to euthanasia, is in some cases of precious value.

It is possible that a free opening into the chest may sometimes effect more than a temporary relief. Assuming the phthisical affection to be small and non-progressive, all the circumstances being favorable for arrest and recovery, aside from the pleurisy and pneumo-thorax dependent on the perforation, maintaining a fistulous opening, as in cases of empyema followed by perforation, will perhaps in some rare instances accomplish a cure. In the absence of any record of success, its possibility from this treatment is at present only conjectural. There can be no objection to making trial of it, inasmuch as the affection, when it occurs as a complication of phthisis, is almost hopeless. The prognosis in general involves only a question of tolerance.

PNEUMONIC PHTHISIS, PULMONARY CONSUMPTION.

Of the different names used to designate the important affection now to be considered, to wit, chronic pneumonia, tuberculous pneumonia, cheesy pneumonia, chronic catarrhal pneumonia, and pulmonary tuberculosis, pneumonic phthisis is to be preferred. Waiving consideration of the pathological questions which have, of late years, given rise to much discussion, the affection will be here considered exclusively with reference to the diagnosis and treatment. Considering it as a form of chronic pneumonia, its inflammatory character is of course assumed. It is nosologically placed among the local diseases, but from this it is by no means to be inferred that the affection does not involve an underlying constitutional morbid condition, that is, a cachexia. Indeed, the existence of such a condition is logically certain, and this fact enters into both the diagnosis and treatment. Moreover, etiological facts cannot be ignored in considering the affection in these aspects. The age of the patient has some weight in the diagnosis, the affection in the majority of cases occurring between twenty and thirty. A congenital tendency and a hereditary influence are also important. Occupation and climatic agencies are of considerable importance in the treatment.

---

[1] *Vide* Series of American Clinical Lectures, edited by E. C. Seguin, M.D., vol. i. No. 111, 1875.

Diagnostic Symptoms.—A cough which at the beginning was so slight that patients often cannot remember the precise date of its commencement; continuing for several weeks, with but little if any expectoration; the expectoration at first small, and consisting of glairy mucus, gradually increasing, becoming more and more opaque, and at length having a nummular appearance—these are points which are strongly diagnostic of pneumonic phthisis. The gross characters of the expectoration, when it has become abundant, are not distinctive. At an advanced period the microscope may show fragments of elastic tissue, which is evidence of destruction of pulmonary substance; but other symptoms and the physical signs are at this period sufficiently explicit.

Pleuritic stitch-pains at the summit of the chest on one side, occurring at successive periods, and on both sides, often referred by the patient to the scapular region, represent attacks of dry circumscribed pleurisy, and therefore have diagnostic significance. These are to be distinguished from pains usually near the base of the chest, and generally on the left side, which denote intercostal neuralgia, this affection being a frequent concomitant of pneumonic phthisis.

Hæmoptysis, that is, an expectoration of pure blood, more or less in quantity, if it have been preceded by cough, and mitral cardiac lesions be excluded, renders the existence of pneumonic phthisis extremely probable. It is presumptive evidence of the disease when not preceded by cough, especially if persistent cough follow. When this symptom is not accompanied by any other evidence of phthisis, it is to be regarded as a premonition of the disease, observations showing that the disease occurs sooner or later in a large proportion of cases.

Increased frequency of respirations points to phthisis, if pulmonary affections other than chronic bronchitis be excluded.

Huskiness or hoarseness of the voice, if persisting and if syphilis be excluded, is evidence of phthisis.

The general symptoms which have a diagnostic bearing, are, progressive loss in weight, increased frequency of the pulse, fever as denoted by a temperature of from 101° to 103°, chilly sensations, or well pronounced chills occurring either irregularly or with periodicity in the afternoon, night sweating either with or without a febrile paroxysm.

Physical Signs of Pneumonic Phthisis.—Diagnostic symptoms are often not sufficiently marked or available for a positive diagnosis. They are always to be conjoined with the evidence afforded by physical signs. The differential diagnosis is between phthisis and chronic bronchitis in the great majority of cases.

The physical signs are conveniently divided into the direct and the accessory. The direct signs are those representing directly the morbid physical conditions which characterize the disease, namely, solidification of lung from the pneumonic exudation, and cavities. The accessory signs are those representing conditions incidental to the foregoing, namely, the presence of liquid in the bronchial tubes and cavities, circumscribed dry pleurisy, and lobular non-tuberculous pneumonia.

Dulness on percussion is an important direct sign. Confined to the summit of the chest or one side, in connection with marked diagnostic symptoms, it renders the diagnosis almost positive. Exceptions, as regards the presence of this sign, are, first, when there is so little solidification, the pneumonic nodules being small and disseminated, that a diminution of the normal resonance is not appreciable. This is especially when the affection is at the summit of the right side of the chest, the normal resonance here being less than on the left side. Second, when lobules between the solidified portions of lung become emphysematous, as is sometimes the case, the resonance may be increased, and is vesiculo-tympanitic in character over the site of the phthisical affection.

If the solidification consist of small disseminated lobules, feebleness of the vesicular murmur, may be the only respiratory sign. The murmur may be either suppressed or it may be too weak for its characters to be studied when there is a greater amount of solidification. Generally, however, the latter is represented by either bronchial respiration and bronchophony, or more frequently, by broncho-vesicular respiration and more or less increase of the vocal resonance. These are the direct signs obtained by auscultation.

An accessory auscultatory sign is the presence of moist bronchial râles at the summit of the chest. These, in conjunction with slight dulness on percussion, and diagnostic symptoms, render the diagnosis quite positive. A pleuritic friction sound confined to the summit is highly diagnostic, taken in connection with dulness and marked symptoms. Indeterminate râles, crumpling, and crackling, if confined to one side, have diagnostic weight. In this category may be embraced interrupted respiratory sounds and undue transmission of the heart sounds. The latter is a valuable sign and often available. A true crepitant râle heard within a circumscribed space is a significant accessory sign.

After the disease has made some progress, inspection furnishes diagnostic signs, namely, depression on one side, as compared with the other side, in the infra-clavicular region, with deficient expansion on inspiration. On the posterior aspect of the chest, diminished elevation of the scapula on one side, with inspiration, is a diagnostic sign, if, on this aspect, the chest present its normal symmetry.

The evidence obtained by percussion over phthisical cavities is a tympanitic resonance at the summit of the chest, within a circumscribed space, with cracked-metal or amphoric intonation. These modifications may often be observed if the ear be brought into close proximity to the open mouth of the patient, when otherwise they would escape observation. The auscultatory signs are the cavernous respiration, the cavernous whisper, gurgling râles, and sometimes the cavernous pectoriloquy.

With reference to prognosis and treatment, it is important, by means especially of physical signs, to determine, not merely the existence of phthisis, but the extent and the stage of the phthisical affection. It is not less important to take into account general symptoms, such as frequency of the pulse, the temperature of the body, the degree of debility and emaciation, the condition as regards appetite and digestion, etc.

TREATMENT OF PNEUMONIC PHTHISIS.

As a basis for a warrantable degree of encouragement to phthisical patients, it is to be considered that, in a certain proportion of cases, recovery takes place; that of the cases not ending in recovery, there is an arrest of the disease in a certain proportion, with more or less retrogression and approximation to recovery; that in other cases the disease does not progress, remaining stationary for an indefinite period, and, finally, that the progress is in some cases extremely slow, the duration extending over many years. The author has established the fact that cases exemplify recovery, arrest with retrogression, non-progression, and slow progress, without either medicinal or hygienic treatment, the fact showing that pneumonic phthisis by no means tends always to a fatal termination, but that, in certain instances, it ends from self-limitation, and manifests an intrinsic tendency to a favorable termination.[1]

The cod-liver oil, which has been largely employed in the treatment of phthisis for the past twenty-five years, is undoubtedly useful, without having any special therapeutical influence. If well tolerated by the digestive organs, its use should be steadily persisted in for a long period, in doses not exceeding half an ounce three times daily. It is best tolerated when taken after meals. The combination with lime and other articles is sometimes of advantage by disguising the oleaginous sensation which often renders the remedy disagreeable. There is no uniformity as regards the kind of oil best tolerated, the brown or strong varieties being best borne by some, and the paler kinds by others. Dr. Balthazar Forster advocates giving sulphuric ether with the oil, or shortly after a dose of the latter has been taken. He thinks the good effects of the oil are thereby increased, which he attributes to an increase of the pancreatic secretion by the ether.

The pancreatic emulsion appears to be a useful addition in some cases, and it is useful when the oil is not tolerated. Cream and butter may be regarded as in a measure substitutes for the oil when the latter is taken with disgust, and when it occasions indigestion or diarrhœa.

The hyposulphites seem to be of service in some cases, although they do not merit the extravagant recommendations by Churchill.

Patients are sometimes benefited by arsenic given in small doses, and continued without increase of dose. This may also be said of minute doses of corrosive sublimate. The observations of Keyes, which show that the latter remedy increases the red corpuscles of the blood and improves nutrition, furnish rational grounds for its employment in cases of phthisis.[2]

Alcoholics taken in considerable, or in large quantity, undoubtedly, in some cases, contribute to an arrest of the disease, or retard its progress. The tolerance of alcoholics is sometimes great in this disease. Their usefulness is to be determined experimentally, in individual cases. They should never be given to the extent of producing alcoholic excitation, that is, any of the characteristic effects of alcoholism. Their continued use, and the quantity to be taken, are to be determined by the immediate effects in each case. Given in small or moderate quantity they are often useful by increasing appetite and promoting digestion.

---

[1] *Vide* work by the author entitled "Phthisis, its Morbid Anatomy, Etiology, Symptomatic Events and Complications, Fatality and Prognosis, Treatment and Physical Diagnosis, in a Series of Clinical Studies," 1875.

[2] *Vide* The Tonic Treatment of Syphilis, by E. L. Keyes, M.D., etc., 1877.

Caoutchouc dissolved in spirits of turpentine and prepared as a confection, has been given in a large number of cases by Dr. Varick, of Jersey City, and is strongly recommended by him as a useful remedy, taking the place of cod-liver oil in the cases in which the latter is not well tolerated.[1]

The vegetable tonic remedies and chalybeates are indicated in proportion as the appetite and digestion are impaired. The objections which have been made to preparations of iron, on the score of an increased tendency to hæmoptysis by their use, are without any foundation. The tincture of the hydrochlorate of iron is one of the most eligible of the chalybeates.

The hygienic is of greater consequence than the medicinal treatment. Including under this heading alimentation, the diet should be nutritious, varied, and abundant, without restrictions with exception of those pertaining to appetite and digestion. To frame rules of dietetics to be rigidly followed in all cases, would be extremely injudicious; the patient is to be guided by instincts and experience, avoiding, as far as may be, the errors incident to the latter. The object is to secure the largest possible assimilation and nutrition. The patient should be encouraged to take fatty articles of food.

Living in the open air as much as possible is an essential part of the hygienic treatment. Muscular exercise, however, carried to the extent of producing much fatigue or exhaustion is injurious. If the disease be not much advanced, and the patient's strength be not greatly impaired, excursions which involve even sleeping in tents or the open air, and "roughing it," provided such a life be congenial, are often of signal benefit. Long sea voyages are in some cases of great benefit.

Change of climate from one humid and variable, to one dry and uniform, is, in a certain proportion of cases, to be recommended. A high altitude is an important climatic element. The benefit of a change of climate depends in a great measure on the opportunity of being constantly in the open air, together with removal from cares and anxieties. The resources for occupation or recreation, and the inducements to be out of doors are to be considered in selecting a place of sojourn. If an arrest of the disease take place apparently from the influences connected with change of climate, it is advisable, if practicable, that the change be made permanent. In advising patients to make trial of a climate at a distance from home, the conditions as regards the disease are to be considered. This should not be advised when the temperature is high, the pulse frequent, the appetite and the digestion poor, and there be much emaciation with muscular weakness, except it be done in compliance with the earnest desire of the patient, and with a full understanding by the friends of the risk of dying away from home.

The clothing of the phthisical patient, as of those affected with other chronic diseases, is to be regulated by the sense of comfort. There can be no better as well as simpler rule than this. The sponge bath, if the shock be not too great, and an invigorating glow follow, is to be recommended.

---

[1] *Vide* article by Dr. Varick, in the New York Med. Record, Nov. 1, 1873.

There are various symptomatic indications for treatment. A high temperature calls for anti-pyretic treatment, namely, full doses of quinia, digitalis, and, perhaps, the cold bath. Night-sweating may often be relieved by the mineral acids, and by astringent applications to the surface. Belladonna or atropia and ergot have been found to relieve this symptom. Dr. J. Milner Fothergill has found atropia a potential remedy. He gives, by the mouth, doses of first $\frac{1}{75}$ grain increased to $\frac{1}{25}$ grain. He states that for "the arrest of the exhausting night perspirations of phthisis, belladonna is as potent as digitalis is in giving tone to a feeble heart."[1] Diarrhœa is to be controlled by bismuth, the different vegetable and mineral astringents, pepsin, with, if necessary, the addition of opium. For cough, if it be more than is required for expectoration, and especially if it prevent sleep, hyoscyamus, belladonna, conium, lactucarium, etc., may be prescribed, avoiding opium if these be sufficient. Cough mixtures containing nauseant remedies are to be avoided. The inhalation of vapor from the volatilization of water containing opium or other narcotics, sometimes palliates cough. Lancinating pains from circumscribed pleurisy are relieved by sinapisms, the belladonna plaster, and, if these do not suffice, a small blister or dry cupping. Dyspnœa may be alleviated by sulphuric or chloric ether, Hoffmann's anodyne, and the compound spirits of lavender.

Chronic Bronchitis.

In cases of chronic bronchitis the diagnostic problem is the discrimination of this disease from pneumonic phthisis. The diagnosis is based mainly on negative facts, that is, on the exclusion of phthisis. The symptoms and the physical signs are to be considered chiefly as involving the absence of the characters distinctive of phthisical disease. The age of the patient has a bearing on the differential diagnosis. Chronic bronchitis is much more frequent in middle and advanced life than during the period of the greatest liability to phthisis, that is, from twenty to thirty years. Men are affected oftener than women.

Diagnostic Symptoms.—The cough and expectoration present no diagnostic criteria of the disease. These symptoms are very variable in different cases. The cough is sometimes spasmodic, violent, paroxysmal, and sometimes devoid of these characters. The severity of the cough depends much on the expectoration; it is severe in proportion as the expectoration is scanty and in tubes of small size. The expectoration varies greatly in quantity and other characters. When it consists of small solid pellets, it is the feature of the variety called by Laennec dry catarrh. On the other hand, when very abundant and serous, the affection was called by Laennec pituitous catarrh, and is now known as bronchorrhœa. There is no advantage in formally dividing the disease into these varieties, although the divisions were based on marked differences as regards the expectoration. The expectoration differs in different cases with respect to the combination of the characters of mucus and pus. It is generally muco-purulent, but it may consist, in a great measure, of pus. The latter, however much it may predominate, is not evidence of phthisis. The expectoration may present bloody points or streaks, but the absence of hæmoptysis, that is, the raising of pure blood, is an important negative fact in bronchitis. So also is the absence of fragments of elastic tissue on examination with the microscope.

---

[1] London Practitioner, Dec. 1876, quoted in Am. Journ. of Med. Sciences, April, 1877, p. 525.

The respirations are but little, if at all, increased in frequency except as an effect of accumulation in the tubes. This is a point of contrast with phthisis.

The pleuritic stitch-pains which belong to the clinical history of phthisis are wanting in chronic bronchitis. Pain or soreness at the base of the chest is a symptom referable to the violence of cough.

The general symptoms lack certain of the diagnostic points relating to phthisis. Fever is slight or wanting, save when attacks of acute bronchitis supervene. Chills, hectic paroxysms, and night sweating are of rare occurrence. Emaciation is not progressive. Hoarseness or huskiness of the voice does not occur. This is also to be said of perineal fistula which, in a patient with chronic cough, is presumptive evidence of phthisis.

Chronic bronchitis is often tolerated for a long period, and very rarely is the immediate cause of death. The local symptoms often subside, and may almost disappear during the summer, returning with the winter season—hence, the significance of the name "winter cough."

Physical Signs. *Inspection.*—If chronic bronchitis be not complicated with emphysema, there are no diagnostic signs to be obtained by inspection.

Percussion.—The resonance on percussion is normal. The only exception is when there is a large accumulation in the bronchial tubes. Even then dulness is slight.

Auscultation.—The respiratory murmur may be temporarily suppressed or weakened over portions of the chest by obstruction of tubes from inflammatory products. Its characters in other respects are unchanged. Vocal resonance is the same as in health. Moist and dry bronchial râles may be heard; but both, at the time of an examination, are often not found. The dry râles, if asthma be excluded, are not abundant. The moist râles are coarse, and are heard at the posterior and lower portions of the chest not localized at the summit as in cases of phthisis.

Mensuration and Succussion.—These methods furnish no signs.

The negative points pertaining to inspection, percussion, and auscultation, are amply sufficient to exclude phthisis, wherever cough and expectoration have been of considerable duration. The cases of doubtful diagnosis are those in which it is a question whether the disease be bronchitis or incipient phthisis. Wherever cough and more or less expectoration have existed for several weeks or months, it may be assumed that, if phthisis exist, these methods of physical examination will not furnish negative results.

Treatment of Chronic Bronchitis.

Chronic bronchitis, if it have existed for a long period, and especially in persons more or less advanced in years, is rarely cured. Other things being equal, the prognosis, as regards recovery, is more unfavorable the longer the affection has existed and the older the patient. Coexisting mitral cardiac lesions stand in the way of recovery. It is, however, incorrect to say that it is never cured. The author has known instances of recovery when the affection has existed for a long period and in old persons.

The physician is fully warranted in giving an assurance that the affection will not eventuate in phthisis. He may also assure patients that, if not cured, it may not shorten life. Notable relief is often obtained by treatment. With reference to prognosis, the liability to emphysema, if not already coexisting, is to be considered. The latter affection belongs among the non-inflammatory structural affections of the lungs.

There are several remedies which have a curative influence over chronic bronchitis. Foremost among these is the iodide of potassium. This remedy will sometimes effect a cure, and in a considerable proportion of cases it has a decided remedial effect. If tolerated, it should be continued long enough to give it a fair trial, that is, for several weeks. While its remedial effect is remarkable in some cases; in other cases it has no influence. The author has not exceeded a dose of from five to fifteen grains three times daily in this affection. Bartholow prefers the iodide of ammonium in this affection.

The muriate of ammonia is another remedy of undoubted utility in a certain proportion of cases, but, in the author's experience, much less likely to prove curative than the iodides.

The chlorate of potassa is a useful remedy, given in doses of half an ounce of a saturated solution, twice or thrice daily, to an adult, and continued for a considerable period.

The balsam of copaiba has, at least in this country, of late years fallen into disuse as a remedy in chronic bronchitis. Perhaps this is, in a measure, owing to the popular association of the remedy with gonorrhœa. Its curative influence in cases of bronchitis is sometimes almost as marked as in the disease just named. Given in capsules it is taken without repugnance.

Turpentine, of which the author cannot speak from as much practical knowledge as of the balsam of copaiba, doubtless has a curative influence in some cases. It is recommended as especially applicable to the affection in aged persons.

Other balsamic remedies, namely, gum ammoniacum, the balsams of Tolu and Peru, the oil of sandal-wood, and benzoic acid may be tried if the foregoing remedies fail. It is a duty to prescribe in succession the various curative remedies, giving to each a fair trial, with the hope that some one may prove effectual.

Tar water, sulphur, and arsenic are to be added to the list of remedies with which the affection is sometimes controlled.

The inhalation of vapor or atomized liquids impregnated with medicinal substances has been much employed of late years, with a view to a topical remedial effect. Iodine, tar, tannin, carbolic acid, and the pernitrate of iron have in this way been brought into contact with the affected mucous surface. This method of treatment in the cases which have come under the author's observation has seldom proved beneficial. The attempts to employ topical treatment by the inhalation of medicinal substances in the form of dry powders, and the injection of liquids into the trachea, are absurd. The inhalation of steam is sometimes useful by facilitating expectoration; and warm vapor containing opium, or other narcotic extracts, may palliate the violence of cough.

There is reason to think that breathing into rarefied air and inspiring condensed air may prevent the occurrence of emphysema. Reference will be made to this treatment in connection with the latter affection.

Cough palliatives are indicated in proportion as the cough is violent or teasing, and superfluous, that is, not necessary for expectoration. As in cases of phthisis, they should not contain nauseants, and opium should not be a constituent if other anodynes will suffice.

Mild counter-irritation over the chest by means of croton oil, sinapisms, dry cupping, and stimulating plasters or embrocations, seems to afford relief, especially if there be soreness or dyspnœa.

The diet should be ample and nutritious, but not stimulating. Alcoholics are to be taken with reserve. If the digestive powers be feeble, it may not be judicious to interdict altogether their use. Experience in each case must be the guide. To maintain the peripheral circulation and the functions of the skin, the body should be well protected against atmospherical changes. Patients living in cold or temperate latitudes often find relief by passing the winter and spring months in a warm climate.

FETID BRONCHITIS.

An expectoration emitting a fetid odor characteristic of animal putrescence, is a diagnostic symptom of gangrene of the lung. An analogous fetor is sometimes unattended by the evidence of gangrene afforded by microscopical examination, and by physical signs. Dilatation of bronchial tubes, involving the detention of muco-purulent sputa, may occasion notable fetor. But it occurs as a rare symptom, in cases which, in other respects, do not offer points of difference from ordinary chronic bronchitis, and a variety of the disease distinguished as fetid bronchitis, is recognized by some writers. The important point in relation to diagnosis is, that notable fetor of the expectoration, accompanied by fetid breath, is not alone proof of either gangrene or dilatation of bronchial tubes. This statement will be repeated in connection with the diagnosis of these affections. The expectoration and breath are sometimes intensely fetid in cases of pleurisy with pneumo-thorax; but the physical signs render the diagnosis of that affection sufficiently easy.

The treatment of fetid bronchitis embraces antiseptic inhalations. As there is reason to think that the putrefactive decomposition depends on the presence of vegetable organisms, the vapor or atomized liquids inhaled should be destructive to these. The vapor of turpentine and carbolic acid spray have been found efficient. Internally, in addition to fulfilling the indications common to this and the ordinary form of bronchitis, quinia in pretty full doses and salicin are specially useful.

ACUTE MILIARY TUBERCULOSIS.

This affection differs essentially from pneumonic phthisis, although having pathological relations with the latter, and the two affections not infrequently coexisting. It cannot with propriety be included among the acute inflammatory affections within the chest. Although for convenience, it is placed nosologically among the local diseases, it is undoubtedly a constitutional affection. It would not be inappropriately considered as an essential fever, the febrile movement evidently not being dependent on the presence of pulmonary tubercles, but representing a general condition underlying these. The name tuberculous fever might be substituted for acute tuberculosis.

In the affection now referred to, miliary tubercles in great abundance are developed in the lungs. In the great majority of cases, however, they are also developed in other organs. In certain cases, especially in children, the presence of tubercles at the base of the brain gives rise to meningitis, and this complication is the immediate cause of death. Tubercles in these cases are almost invariably found in the lungs and in other organs. This variety of the affection will be considered in connection with the diseases of the nervous system.

The association of acute tuberculosis with pneumonic phthisis is to be borne in mind. In a certain proportion of cases of the latter, the former supervenes, and occasions the fatal termination.

Acute miliary tuberculosis, an affection characterized by frequency of the respirations and pulse, more or less fever, often lividity of the prolabia, great prostration, ends fatally after a few days or weeks, the average duration being about a month.

Cough is a constant symptom, but it is rarely violent, and may not have much prominence. Expectoration is sometimes, although very rarely, wanting. It consists of viscid mucus which may present bloody streaks. Hæmoptysis is an occasional symptom, and is sometimes profuse. The respirations are generally much increased in frequency, from 40 to 60 per minute. Dyspnœa is more or less marked, and it may amount to orthopnœa. In some cases, however, the patient, although panting, does not complain of suffering from want of breath.

The pulse is usually very frequent, varying from 120 to 150. Cyanosis is more or less marked on the prolabia, the mucous membrane, and the ends of the fingers. The temperature of the body varies much in different cases and at different times in the same case. There is no rule as regards the daily fluctuation. It may fall to the normal standard before death. There is generally complete anorexia; prostration progressively increases, and the patient dies in a state of collapse.

The local symptoms are of course much modified if the affection supervene upon pneumonic phthisis, especially as regards cough and expectoration. If in the course of the latter disease the respirations become suddenly rapid with notable frequency of pulse and rise of temperature, other complications being excluded, acute tuberculosis is to be inferred.

The evidence of acute tuberculosis afforded by physical signs is chiefly negative. Miliary tubercles disseminated about equally in the lungs occasion no abnormal disparity in percussion-resonance between the two sides of the chest, nor as regards auscultatory signs pertaining to the respiration and voice. Dry and moist bronchial râles may be heard, but these in general are not abundant, and they may be wanting. The negative result of physical exploration warrants the exclusion of other pulmonary affections with which, guided alone by symptoms, acute tuberculosis might be confounded, namely, pneumonia, capillary bronchitis, and pleurisy.

The error in diagnosis into which the practitioner is most likely to fall, is mistaking the affection for typhoid fever. This error would be less likely to be committed were not cases of acute tuberculosis so rare as to offer practitioners few opportunities for the practical discrimination, and for this reason the affection is not suspected. The points involved in the differential diagnosis are the following: much cough, and notable frequency of respirations, with cyanosis, do not belong to the clinical history of typhoid fever, if uncomplicated with pneumonia; and the latter may be excluded by the absence of its physical signs; the rules in regard to the increment of the body heat and its diurnal fluctuations, which generally hold true in cases of typhoid fever, are not applicable to acute tuberculosis. In cases of typhoid fever in which the symptoms denoted a condition of gravity equal to that in acute tuberculosis, the heat of the body would, as a rule, be higher than in the latter affection. The absence of the abdominal symptoms which are diagnostic of typhoid fever, and of the characteristic eruptions, warrant the probable exclusion of this disease under circumstances which point to the existence of acute tuberculosis.

With due attention to these points, it must be confessed the discrimination is not always easy. Not only may acute tuberculosis be mistaken for typhoid fever, but either the latter or typho-malarial fever may be considered to be tuberculous disease. If a case of supposed acute tuberculosis end in recovery, an error of diagnosis is to be inferred, inasmuch as this affection has always a fatal termination.

The prognosis being as just stated, there are, of course, no curative measures of treatment. Something can be done in the way of palliation of symptoms. If there be hyperpyrexia, the anti-pyretic remedies are indicated. The action of the heart may be rendered less frequent and feeble by digitalis. Dyspnœa may be alleviated by the ethers. Anodyne remedies will diminish discomfort from restlessness and insomnia. Palliative and supporting measures constitute the treatment.

INTERSTITIAL PNEUMONIA. FIBROID PHTHISIS. CIRRHOSIS OF LUNG. PULMONARY SCLEROSIS.

The condition expressed by the foregoing names enters more or less largely into the morbid anatomy in many cases of pneumonic phthisis. It is the anatomical characteristic of a substantive affection when it exists independently of either ordinary phthisis, or the presence of tubercles. The term chronic pneumonia has been used by writers to designate this affection.

Certain pathological facts are to be borne in mind with reference to the diagnosis. In the great majority of cases it is a unilateral affection. It may be limited to a single lobe, but it oftener extends over an entire lung. It causes considerable, and sometimes great, shrinkage of the lung affected, and a corresponding contraction of the side of the chest. In a small minority of cases, both lungs are affected, the volume of each lung being more or less diminished. Dilatation of bronchial tubes either sacculated or diffused (bronchiectasis) usually coexists, and explains certain symptoms and signs.

When the affection is unilateral, and extends over the whole of a lung, the contraction of the affected side, and the restricted respiratory movements, are suggestive of the appearances after chronic pleurisy or empyema. The signs obtained by percussion and auscultation, however, at once show something more than mere diminution of the volume of the lung. In some situations, there is notable dulness or even flatness on percussion, and in other situations, there is tympanitic resonance, with perhaps cracked metal or amphoric intonation. The respiration is bronchial in some situations, and in other situations, either purely cavernous or broncho-cavernous. Moist bronchial râles either coarse or fine, or both combined, are generally heard. The vocal resonance and bronchial whisper are either notably increased, or they are bronchophonic. These signs represent different degrees of solidification of lung from the abnormal production of interstitial tissue, dilated bronchial tubes, and bronchitis with the production in more or less abundance of muco-pus. The shrinkage of the lung causes displacement of the heart. If the left lung be the seat of the affection, the heart is raised and carried to the left. If the right lung be affected, the heart may be found removed to the right of the sternum.

Of the local symptoms, cough is more or less prominent, occurring in some cases, in severe paroxysms. The muco-purulent expectoration is often large. It is sometimes notably fetid. The fetor may denote simply putrefactive change incident to the retention of the expectoration in dilated bronchi, or it may be a symptom of circumscribed gangrene which is an intercurrent condition in some cases. If the latter be the explanation, the débris of pulmonary tissue may be found by microscopical examination of the sputa. Hæmoptysis is not infrequent. Stitch-pains enter into the clinical history, representing the dry pleurisies which lead to the pleuritic adhesions found after death. The frequency of the respirations is more or less increased. Cyanotic lividity may be present, representing dilatation of the right side of the heart, and the latter lesion may be sufficient to occasion general dropsy.

The general symptoms—fever, frequency of pulse, emaciation, muscular weakness, etc.—vary much in different cases. The affection may end fatally after a few months, or it may be tolerated for many years, patients, perhaps, dying of some intercurrent disease. The author has reported a case in which the physical signs showed the affection, limited to the lower lobe of the left lung, to have existed for more than ten years, the patient at the end of that period being in fair general health and with few local symptoms.[1]

The diagnosis involves the exclusion of pneumonic phthisis and carcinomatous infiltration of lung. With the signs which have been stated, pneumonic phthisis is excluded by the fact of the limitation of the disease to one side. In a case of pneumonic phthisis presenting on one side of the chest these signs, evidence of more or less disease would be found on the other side. If the interstitial pneumonia affect both lungs, the exclusion of pneumonic phthisis is not as easy. The better tolerance of the former and its longer average duration are diagnostic points. The discrimination is of practical importance chiefly with reference to the prognosis. Carcinomatous infiltration of one lung, which has led to contraction of the chest, may give rise to signs analogous to those in unilateral interstitial pneumonia. The former is attended with more pain than the latter, although pain is not always a prominent symptom in cases of carcinoma. The cancerous cachexia may be marked, and the duration of the carcinomatous affection is less. Here, too, it is chiefly on account of the prognosis that the exclusion of carcinoma is desirable.

---

[1] *Vide* Phthisis, its Morbid Anatomy, Etiology, etc., in a Series of Clinical Studies, 1875, page 440.

Although the treatment does not embrace curative measures, much may be done by remedies and hygienic means to render the system tolerant of the affection. Tonic remedies, a nutritious diet, life in the open air, and the selection of a favorable climate, may stay the progress of the disease and prolong life indefinitely. In a case already referred to, the affection, which has existed for more than ten years, is nearly innocuous, notwithstanding the portion of the chest corresponding to the lower lobe of the left lung is much contracted, and the signs of solidification over this portion are marked. Symptomatic indications relate to cough, dyspnœa, etc. The remedies to fulfil these are the same as when similar symptoms occur in other pathological connections.

III.

STRUCTURAL DISEASES OF THE RESPIRATORY ORGANS WITHIN THE CHEST.

IN this class are embraced affections which in general involve appreciable changes of structure, without inflammation as an essential condition. Obstruction of either the lower portion of the trachea or one of the pulmonary bronchi, will be a heading under which certain affections in this class are grouped. Dilatation of the bronchial tubes is a lesion incident to chronic bronchitis, phthisis, and interstitial pneumonia, especially the two last-named affections. It is an important anatomical element in these affections; but, with reference to diagnosis and treatment, it does not claim distinct consideration.

The several forms of emphysema belong in this class of affections, and will be considered under a distinct heading.

Pulmonary gangrene will be considered separately. Carcinoma, with other morbid growths and parasitic productions, will be considered under one heading.

STRUCTURAL DISEASES PRODUCING OBSTRUCTION OF THE LOWER PORTION OF THE TRACHEA OR OF A PRIMARY BRONCHUS.

Tracheal obstruction sufficient to prevent the free passage of air, causes labored breathing. The acts of respiration are not increased in frequency; the patient does not pant, but there is the appearance of labor in either act. The degree of labor and the suffering from a sense of the want of breath or dyspnœa, are, of course, in proportion to the degree of obstruction.

Obstruction of a primary bronchus, even if considerable, does not occasion embarrassment of breathing so long as the patient is at rest; but the want of breath is felt on exercise. The respirations are not labored, but panting; in other words, they are increased in frequency in proportion to the amount of obstruction.

The demonstrative proof of obstruction, either of the lower portion of the trachea or in a primary bronchus, is derived from physical signs. If the obstruction be tracheal, the murmur of respiration is weakened equally over both sides of the chest. A whistling sound is sometimes heard at a distance from the patient, accompanying both respiratory acts. This sound is called Stridor. Pulmonary affections are excluded by the absence of signs other than bilateral weakness of the respiratory murmur. Laryngeal affections are excluded by the voice remaining unaffected. Œdema of the glottis is excluded by the fact that the obstruction is apparent in expiration as well as in inspiration, and by the fact that œdematous tumors above the vocal cords are not determined by the touch. If the tracheal obstruction be considerable, the expansion of the chest on both sides is restrained; the soft parts above the clavicles are depressed in the act of inspiration, and the lower part of the chest is retracted during this act. These signs on inspection, however, are also present in laryngeal obstruction and in cases of pulmonary emphysema.

If one of the primary bronchi be obstructed, the respiratory murmur is weakened or suppressed over the side of the chest corresponding to the affected bronchus, and the intensity of that murmur on the opposite side is increased. These signs, in conjunction with normal resonance on percussion, and the vocal resonance remaining normal on the affected side, the latter signs showing absence of any pulmonary affection on that side, establish the diagnosis of an obstructed bronchus. The diagnosis is not less positive in cases in which there exists pulmonary disease on the affected side, provided the disease be limited to a portion of the lung, or in case of a phthisical affection seated in the upper lobe; under these circumstances, notable diminution or suppression of respiratory sound over the whole of the affected side, is proof of bronchial obstruction. The affections which may involve suppression of respiratory sound over one side, namely, pleurisy with effusion, empyema, chronic pneumonia, and pneumo-thorax, are easily excluded by the absence of vocal and respiratory signs which would certainly be present if these affections existed.

In cases of obstruction of a primary bronchus, the expansion of the affected side with inspiration is diminished, and the side may be more or less contracted. It is easy to understand that complete occlusion of a bronchus might lead to collapse of the lung and notable contraction of the affected side. An instance of this kind has not fallen under the author's observation.

The affections producing tracheal and bronchial obstruction are varied. They may be seated either within or without the tubes, in the latter case the obstruction being produced by compression. Obstruction by compression is the most frequent.

The presence of inhaled foreign bodies is one mode of internal obstruction. Bodies which pass beyond the glottis, if too large to enter either of the primary bronchi, are lodged at the point of bifurcation. Their presence in this situation, which it is of much importance to ascertain as preliminary to surgical interference, is determined by the fact of the weakened respiratory murmur being bilateral. If the bodies be not too large, they are likely to pass into either the right or the left primary bronchus. They are much oftener lodged in the right than in the left bronchus. It is easy to determine in which of the bronchi they are situated, by the disparity between the two sides of the chest in the intensity of the respiratory murmur; and this it may be of much importance for the surgeon to know. A foreign body may, however, be lodged in one bronchus at one time and at another time in the other bronchus, having been dislodged by violent efforts of coughing, and its situation changed; hence, immediately before, and even during, the operation of tracheotomy, the bronchus which is obstructed should be ascertained by auscultation.

Tracheal stenosis may be caused by cicatrization of a syphilitic ulcer. The author has met with an instance in which death was caused by this lesion.

An aneurismal tumor springing from the transverse portion of the aortic arch, and extending upward, may compress the trachea. Other tumors may be so situated as to produce this effect. The presence of a tumor can generally be ascertained by means of physical signs, and, if aneurismal, this fact is determinable in the great majority of cases. The absence of signs denoting the presence of a tumor warrants the conclusion that the obstructing affection is internal. A feature which distinguishes obstruction of either the trachea or a primary bronchus, by the presence of an aneurism, is the varying degree of obstruction at different times, owing to variations in the quantity of blood which the aneurismal tumor contains and in the force of the heart's action.

Obstruction of a primary bronchus is not infrequently produced by an aneurismal tumor arising from the junction of either the ascending or descending aorta with the transverse portion of the arch. The physical evidence of an obstructed bronchus in a patient over forty years of age should always suggest the probability of aneurism, and the importance of seeking for its diagnostic signs.

An enlarged bronchial gland, so situated as to press upon a bronchus, is a not infrequent cause of obstruction. This occurs in a certain proportion of the cases of phthisis, and in scrofulous children. Enlargement of the lymphatic glands of the neck renders probable this explanation of the bronchial obstruction; but the latter is produced by enlargement of the bronchial glands when those of the neck are unaffected. Mediastinal tumors may take a direction involving pressure on a bronchus; so also hydatid cysts and other tumors developed in the pleura or in the lungs. Their existence and boundaries may be determinable by physical signs added to the evidence of bronchial obstruction. Cases have been reported in which dilatation of the left ventricle was the cause of obstruction of the left bronchus.

The treatment in cases of tracheal and bronchial obstruction has reference to the obstructing affections. When these are of such a character as not to admit of curative treatment (which is usually the case), it is a matter of necessity for the patient to conform, as regards exercise, etc., to a diminished capacity for respiration. Enlarged bronchial glands may decrease in size, causing less obstruction, and the preparations of iodine may perhaps contribute thereto. The decrease in the size of aneurismal tumors is sometimes marked under measures of treatment.

PULMONARY EMPHYSEMA.

The terms pulmonary, vesicular or alveolar, and lobar emphysema, when employed to designate an individual or a substantive affection, denote dilatation of the air cells, the lesion being bilateral, affecting especially the upper lobes, and, as a rule, more marked in the upper lobe of the left than of the right lung. The physical conditions in this affection which stand in immediate relation to its diagnostic symptoms and signs, are increased volume of the lungs from persistent expansion, and a diminished range of contractile movement in the acts of expiration. With reference to diagnosis, its association frequently with asthma, and almost constantly with bronchitis, are pathological facts to be kept in view. The occurrence of enlargement of the right side of the heart as an effect, is a fact which has a bearing on the interpretation of symptoms and on the treatment. Another fact, valuable more especially in its bearing on the diagnosis of phthisis in connection with emphysema, is the protective influence of the latter against the former affection. The secondary development of phthisis in cases of emphysema is extremely rare.

Having considered this affection, certain forms distinguished as lobular, interlobular or interstitial, subpleural, and senile or atrophic emphysema, will be noticed under the heading Varieties of Emphysema.

The diagnostic local symptoms of vesicular, lobar emphysema, relate to respiration and cough. A moderate degree and extent of the affection occasion want of breath on exercise, the breathing being without habitual embarrassment; the patient is unable to run, or to walk rapidly, and especially to ascend stairs, without the respiration becoming labored. If the affection be considerable, the patient has labored breathing when at rest. The labor is especially manifest in expiration; this act is prolonged, the inspiratory act being shortened and quickened. A still greater amount of the lesion involves much suffering from dyspnœa; the cervical veins are enlarged; the prolabia and face are cyanotic; the patient is unable to lie down; there is œdema of the limbs, and there may be anasarca or general dropsy. The latter symptoms denote dilatation of the right ventricle and auricle.

Cough and expectoration are usually symptoms. They relate, not to the emphysema, but to the coexisting bronchitis; they are wanting if the latter affection do not coexist. Their prominence, as symptoms, depends on the bronchial affection. The emphysema, however, owing to the limited range of expiratory movement, occasions difficulty in effecting expectoration. The cough is often spasmodic, consisting of a series of short expiratory efforts, resembling, in this respect, a paroxysm of whooping cough. During the cough the face becomes deeply congested, the veins of the neck are swollen, and lividity is sometimes marked, these symptoms denoting distension of the right auricle. The expectoration varies in quantity and in other characters as in different cases of chronic bronchitis without emphysema.

The general symptoms offer nothing diagnostic. A moderate emphysema gives rise to little, if any, constitutional disturbance; the appetite, digestion, nutrition, and muscular strength may not be impaired. The affection is well tolerated for an indefinite period. The remote effects, namely, habitual labor in breathing, cyanosis, and general dropsy, tell upon the vital powers, and lead to a fatal termination; but the same effects occur in other pathological connections, and therefore do not afford a basis for a positive diagnosis. The diagnostic criteria of the affection are derived from the physical signs.

The physical diagnosis in cases of moderate emphysema is based on positive and negative evidence furnished by percussion and auscultation. The resonance on percussion over the upper lobes of both lungs is vesiculo-tympanitic, as compared with the resonance over the lower lobes. In other words, the intensity is greater, the pitch is higher, the vesicular and the tympanitic quality being combined. This vesiculo-tympanitic resonance almost invariably is more marked over the upper lobe of the left, than of the right, lung. The respiratory murmur, especially over the upper lobes, is weakened, this being generally more marked over the upper lobe of the left lung. The inspiratory sound is shortened, and, in a certain proportion of cases, the expiratory sound is prolonged. The prolonged expiratory sound is low in pitch and blowing in quality, in these characters corresponding to the expiratory sound in health, and differing from the high pitched, tubular expiration which represents solidification of lung. The foregoing signs constitute the positive evidence of emphysema. The negative evidence is the vocal resonance and fremitus, together with the bronchial whisper, remaining normal. The vocal resonance, and the resonance on percussion, show that the area of the superficial cardiac dulness is lessened.

Moderate emphysema with bronchitis is liable to be confounded with phthisis. This error is not very infrequent, even with those who base the diagnosis on physical signs. The lesser degree of vesiculo-tympanitic resonance on the right, as compared with the left, side at the summit of the chest, is thought to be dulness on percussion, and the vocal resonance at the right summit, which is normally greater than on the left side, is considered to be abnormally increased. A prolonged and high-pitched expiration in the right infra-clavicular region occurs in some healthy persons, and, existing with the foregoing signs, it is considered to be morbid. Moreover, a moderate amount of emphysema may cause some fulness in the left infra-clavicular region and not in the right, and depression seems to be apparent in the latter. Taking these several points in connection with the pulmonary symptoms, the conclusion that there is a phthisical affection at the apex of the right lung appears to be clear. The error is avoided by a correct knowledge of the distinctive characters of physical signs, derived from pitch and quality of sound, together with intensity, and a practical acquaintance with the points of normal disparity between the two sides of the chest.

Emphysema when it is considerable or great, having existed for a long time, and especially when it has developed in early life, presents diagnostic features which, with a fair knowledge of physical exploration, render the diagnosis sufficiently easy. The signs on inspection are so characteristic that the affection may be recognized at a glance. The anterior surface of the chest at its upper and middle portions is enlarged. The chest in this situation is barrel-shaped. The lower portion of the chest appears to be contracted. The ribs have a horizontal direction. The normal dulness in the præcordia is notably diminished. The sternum and ribs rise together in forced inspiration. The lower portions are contracted with the inspiratory act. The cardiac impulse is not seen nor felt at the normal situation at the apex, but is apparent to the eye and the touch in the epigastrium. The parts above the sternum and clavicles sink inward in inspiration. The liver may be depressed below the false ribs. The second sound of the heart emanating from the pulmonic valves is intensified. There is anterior curvature of the spine. With these visible signs, the murmur of respiration over the upper lobes is greatly weakened or suppressed, vocal resonance and fremitis remaining unaffected. Sibilant and sonorous râles are often heard on auscultation, even when well-marked asthma does not coexist. The coexistence of the latter affection is not uncommon, and the fact is corroborative of the diagnosis.

Important therapeutical indications in most cases of emphysema relate to the coexisting bronchitis. The hygienic and remedial treatment of the latter affection is the same as when it is not connected with emphysema (*vide* p. 122). If the remedies which experience has shown to have a curative influence prove efficient in relieving the bronchial affection, not only is the emphysema better tolerated, but it is not likely to increase, and it may decrease. The author has known the characteristic deformity to be notably diminished when the iodide of potassium effected a marked improvement as regards the chronic bronchitis.

In the treatment of bronchitis, with and without emphysema, the inspiration of compressed air (the pressure increased by one and a quarter to one and a half atmospheres) has for many years been employed by German physicians, but, as yet, very little in this country. The facility of employing this measure of treatment has been much increased by the use of different kinds of apparatus in the place of "pneumatic chambers" not transportable. It is claimed that by this method of treatment the bronchitis associated with emphysema is often cured, and, if not cured, that it is notably ameliorated. It is further claimed that the emphysema in a considerable proportion of cases may be cured. The immediate effect of the inspiration of compressed air upon the respiratory and circulatory organs is calmative; the action of the heart is rendered more complete, the blood being more thoroughly expelled from its cavities.

More recently it has been ascertained that expiration into rarefied air has a still greater curative influence on emphysema. The difficulty in this affection being an inability to relieve the lungs of an overplus of air, breathing into rarefied air has the effect of suction; the expiratory act is more efficient, and the distension of the lungs is lessened by diminishing the excess of the residual air. Inspiring compressed air and breathing into rarefied air may be combined, so as to secure the benefit of each. The emphysematous condition under this treatment has been found to decrease, the lungs, in a certain proportion of cases, resuming their normal volume. Amelioration is obtained if a cure be not effected. It is important to add that this treatment is contraindicated when dilatation of the heart has occurred. A very simple apparatus for the inspiration of compressed air, and breathing into rarefied air, devised by Fränkel, of Berlin, consists of the bellows of the accordeon, provided with a mouthpiece. By expanding the bellows the air is rarefied, and by the reverse movement the air is compressed.[1]

VARIETIES OF EMPHYSEMA.

LOBULAR EMPHYSEMA.—Lobular is distinguished from lobar emphysema by the limitation ot the morbid condition to circumscribed spaces which form emphysematous nodules, varying in size and number, either existing in both lungs, or confined to one lung. They occur oftener in the upper than in the lower lobes. These emphysematous nodules are secondary to affections in which portions of the pulmonary structure become solidified and diminished in size, namely, in phthisis, collapse of pulmonary lobules or broncho-pneumonia, and disseminated carcinoma. The dilatation of air-cells takes place in situations proximate to these portions, and is dependent thereon; hence this variety is sometimes termed vicarious emphysema.

Lobular emphysema may give rise to vesiculo-tympanitic resonance on percussion over the site of solidified portions of lung in cases of phthisis, broncho-pneumonia, and carcinoma—a fact to be borne in mind in connection with the diagnosis of these affections.

This variety of emphysema calls for no special treatment.

INTERLOBULAR AND SUBPLEURAL EMPHYSEMA.—In this variety the anatomical condition is that which the term emphysema denotes whenever it is situated elsewhere than in the pulmonary organs; in other words, the air is in the meshes of the areolar or connective tissue, and hence it is called interstitial emphysema. Air in the interlobular connective tissue compresses the air vesicles, and in this way restricts their functional capacity. The affection is thus essentially different from the vesicular emphysema in the lobar and lobular forms.

---

[1] *Vide* article on Emphysema, by Hertz, in Ziemssen's Cyclopædia, vol. v. For an account of Fränkel's instrument, *vide* The New York Medical Record, Aug. 28, 1875, article by Dr. A. Rose.

The air can gain entrance into the areolar tissue only as an effect of rupture or wounds which open a communication with the air vesicles. A rupture sometimes takes place during violent efforts of coughing or straining. Oftener the affection is caused by penetrating wounds of the chest.

The air forced by the expiratory acts into the interlobular tissue may pass into the mediastinum; thence to the subcutaneous tissue of the neck, and it may be diffused over the body, giving to the trunk and limbs, in some cases, an enormous increase of size.

The diagnosis can only be made when subcutaneous emphysema follows.

The presence of air beneath the skin even in large quantity, and diffused over the trunk and limbs, occasions only inconvenience from the increase of bulk. Mendicants sometimes inflate portions of the body through punctures in order to produce an appearance of deformity or disease. The condition is usually of brief duration, the communication between the air vesicles and areolar tissue closing, and the extravasated air disappearing without any active measures of treatment.

An escape of air beneath the pleura, dilating the latter over a limited space, giving rise to an air-bleb which sometimes attains to a large size, is another form of interstitial emphysema. If the pleural wall of the bleb give way (which happens very rarely), air may escape into the pleural cavity, and give rise to pneumo-thorax without pleuritic effusion. When this occurs, subpleural emphysema may be inferred; otherwise, a diagnosis is impracticable.

Atrophic or Senile Emphysema.—This variety is, in reality, not a form of emphysema, although so called. The lesion is atrophy and destruction of the vesicular walls, in consequence of which coalescence of cells takes place, forming cavities more or less numerous and varying in size. The lungs may become greatly diminished in volume, and the chest-walls are proportionately contracted. Their functional capacity is lessened in proportion to the degree and extent of the lesion. The affection occurs chiefly in aged persons. The proper name is pulmonary atrophy.

If the functional capacity be not impaired below that required in ordinary breathing, the patient does not experience habitual embarrassment, but is sensible of want of breath on exercise. A greater amount of lesion occasions increased frequency of respirations, dyspnœa, and cyanosis.

The signs on percussion and auscultation do not differ materially from those in cases of vesicular, lobar emphysema. The differential diagnosis is based on the fact of contraction of the chest, instead of the enlargement which characterizes the latter affection. Other affections involving similar symptoms are excluded by the absence of their diagnostic signs.

The lesion is irremediable, and the treatment consists of palliative measures.

Pulmonary Gangrene.

The division of pulmonary gangrene into two forms, namely, diffused and circumscribed, which was instituted by Laennec, is still retained with propriety, inasmuch as they differ materially in respect of symptoms, physical signs, and prognosis. It is, however, to be borne in mind that gangrene which at first is circumscribed may become diffused. It is circumscribed when limited to a portion or sometimes to several portions varying in size from that of a cranberry to an orange. In diffused gangrene an entire lobe, and even an entire lung, may be affected. In the majority of the cases of the latter form, it is incidental to pneumonia. A fatal termination in this form is inevitable.

In both forms the diagnosis is to be based on the odor of the breath and expectoration, together with the macroscopic and microscopic appearances of the latter. The obvious appearances of the expectoration in connection with the fetor are sufficiently diagnostic. The evidence afforded by the microscope is the presence of pulmonary tissue, especially portions of elastic fibres, in specimens examined. The fetor of the breath is especially marked in acts of coughing, and it may precede for several days the characteristic expectoration.

The affection, when its diagnostic characters relating to the breath and expectoration are marked, can only be confounded with fetid bronchitis and certain cases of pneumo-thorax. The author has known of a case in which the evacuation of a fecal abscess through the bronchial tubes was accompanied by a fetor which suggested gangrene; but a case of this kind is among the most infrequent of the rare events in clinical experience. It is very rare in cases of pleurisy with pneumo-thorax for the expectorated pus to emit notable fetor. This occurs when the affection is caused by circumscribed gangrene and perforation of lung, and when empyema follows necrosis of the ribs or of the vertebræ. Pneumo-thorax is easily recognized by the presence of diagnostic physical signs, and as easily excluded by the absence of these signs. The expectoration in cases of bronchitis very rarely has a fetor comparable to that in cases of gangrene. The fetor is sometimes great in bronchitis with sacculated dilatation of bronchial tubes. In these cases the signs not only of bronchitis, but of bronchiectasis, and, generally, of interstitial pneumonia or cirrhosis of lung, precede for a long time the fetid expectoration. Gangrene, however, sometimes occurs in cases of chronic bronchitis with dilatation of the bronchial tubes.

The fetor in pulmonary gangrene is characteristic although not easily described. It is a fetor which is recognizable as arising from sphacelation of the soft animal tissues. At the instant of the expectoration of a quantity of the gangrenous debris, the apartment is sometimes filled with a stench which is insupportable. The expectorated matter, however, loses this intense fetor after a short time.

The physical signs of circumscribed gangrene prior to the characteristic breath and expectoration are, notable dulness on percussion within a limited area, and within this area either absence of respiratory murmur or a weak bronchial respiration, and moist râles. The previous history and the situation of the affected portion of lung may exclude, with much probability, phthisis. The gangrenous affection is rarely situated at or near the apex of the lung. It is oftenest near the posterior aspect of the upper portion of the lower lobe, and more frequently on the right side. The symptoms and the signs do not warrant the exclusion of embolic pneumonia, and, in fact, circumscribed gangrene is perhaps in the majority of cases an effect of pulmonary embolism. After the sloughing away and expectoration of the sphacelated portion of lung, the cavernous physical signs may be discovered. At this time, however, the diagnosis has been established. In some cases the expectoration from phthisical cavities is fetid from superficial sloughing of pulmonary tissue within the cavity. The antecedent history together with present symptoms and signs, sufficiently exclude pulmonary gangrene considered as a substantive affection.

The local and general symptoms in cases of circumscribed gangrene are not diagnostic, but they are to be taken into account in the prognosis and treatment. It should be mentioned that hæmoptysis is liable to occur. Complete recovery takes place in a certain proportion of cases. A fatal termination is preceded by symptoms denoting slow asthenia. Recovery may take place when a cavity of considerable size results from the slough, the patient not being at any time confined to the bed nor even to the house. A case exemplifying this statement has been observed by the author.

The predominant indications for treatment relate to the local and general symptoms. Cough, if violent or teasing, should be alleviated. The system should be supported by a nutritious diet. Alcoholics are to be given in conformity with indications derived especially from the circulation, and according to their immediate effects. Tonic remedies should enter into the treatment. The inhalation of the vapor of turpentine, advocated by Scoda, is considered an important measure by German practitioners. As an antiseptic measure the inhalation of vapor or spray containing carbolic acid is useful, and it may possibly prevent an extension of the gangrenous affection. A simple and sufficiently effective mode of inhaling turpentine is to pour a few teaspoonfuls of the oil on warm water and breathe the vapor. The carbolic acid is best inhaled in the form of spray produced by an atomizer.

CARCINOMATA AND OTHER MORBID GROWTHS. PARASITIC PRODUCTIONS.

The topics embraced under this heading may be arranged as follows: Carcinoma and other morbid growths seated in the lungs, mediastinal tumors, and parasites.

CARCINOMA AND OTHER MORBID GROWTHS.—Carcinoma is a rare affection in the lungs. As a primary affection it is extremely rare. Cases of other morbid growths are still more infrequent, and claim in this work only brief notice.

Carcinoma may be seated in only one lung or in both lungs. When seated in both lungs, as it is usually, the affection is secondary. When seated in one lung the inference is that it is primary. Whether it be primary or secondary is a point of importance with reference to the diagnosis. The fact that the pulmonary affection follows cancer in some other situation, and especially when a cancerous growth in the mamma or elsewhere has been removed, renders the carcinomatous nature of the affection extremely probable. It occurs in the lungs in two forms, namely, 1st. In the form of cancerous nodules, varying in size from that of a pea to an orange, the nodules disseminated, generally in both lungs, and the number very variable; 2d. In the form of an infiltration diffused over a large part or the whole of one lung. The latter form may occasion considerable enlargement of the lung. The affection is then either the encephaloid or colloid variety of carcinoma. On the other hand, the affected lung may be diminished considerably in size. The variety is then that known as scirrhus.

The local symptoms are not distinctive. In proportion as the morbid growth diminishes the functional capacity of the lungs, the respirations are frequent, and dyspnœa with cyanosis are in some cases prominent symptoms. Cough and expectoration are more or less prominent, these symptoms representing coexisting bronchitis. Hæmoptysis is an occasional symptom. A gelatinous expectoration colored with blood, resembling currant jelly, has diagnostic significance, but it is a symptom of rare occurrence. Shooting, sharp pains, such as attend carcinomatous disease in other situations, occur in some cases, but they are not always marked.

The general symptoms, like the local, are not distinctive. The chronicity of the affection has a bearing on the diagnosis. The duration in the majority of cases is from one to two years, and in some cases it is much longer.

Physical signs, when the affection is bilateral and consists of small disseminated nodules, are not definite. Over nodules of the size of a hickory-nut, and, still more, of an orange, dulness on percussion may be appreciable, together with a broncho-vesicular respiration and increase of vocal resonance. Moist bronchial râles, due to secondary bronchitis, may be heard in different situations. These signs, associated with local symptoms, render the diagnosis quite positive if cancer in some other situation exist, or has existed, and the fact that this form of the affection is generally secondary is to be kept in mind. As regards physical signs, the affection in this form is not unlike broncho-pneumonia and acute miliary tuberculosis; but these are acute affections, and are therefore excluded. It is not as easy to exclude phthisis. The carcinomatous nodules are as likely to be situated in the middle or lower portions of the lungs as at the apex, whereas, in phthisis, the solidified masses are very uniformly in the latter situation. If the pulmonary affection be primary, and cancer elsewhere have not been secondarily developed, it must be confessed that this differential diagnosis is not always practicable.

Infiltrated medullary cancer, limited to one lung, and causing enlargement of the chest on one side, may give rise to the visible signs of chronic pleurisy or empyema. Moreover, the pleural cavity in these cases may contain more or less pleuritic effusion, and, under these circumstances, the differential diagnosis from signs is impracticable. An exploratory puncture, however, excludes pleurisy if there be no pleuritic effusion, and the persistence of the enlargement after liquid has been withdrawn by aspiration, shows its dependence on an increased volume of lung. In either case, the diagnosis of carcinoma is probable.

In a case of unilateral scirrhus with contraction of the affected side, the signs may be analogous to those in cirrhosis of lung. Bronchial, and broncho-cavernous respiration, and bronchophony are less marked in cases of the latter affection. The occurrence of cancer elsewhere, either preceding or following the pulmonary affection, may determine this differential diagnosis. Another diagnostic point is the duration of cirrhosis beyond the usual limits of cancer.

Palliation of symptoms and sanitary measures constitute the treatment in cases of carcinoma.

Morbid growths, other than the carcinomatous, namely, fibroma, lipoma, enchondroma, osteoma, and myxoma, from their infrequency, have very little practical importance. Moreover, they generally give rise to little or no disturbance, and they do not admit of diagnosis. They are of interest chiefly to the pathologist.

MEDIASTINAL TUMORS.—Mediastinal tumors, which are generally either carcinomatous or sarcomatous, have their point of departure oftener in the anterior than in the posterior mediastinum; they may extend thence into either one side, or both sides of the chest, compressing the lung, not infrequently displacing the heart from its normal situation, sometimes depressing the diaphragm, pushing forward the sternum and increasing the dimensions of the chest. Not infrequently they press upon the trachea, or the primary bronchi, on the superior vena cava, the vena innominata, and the subclavian veins, and sometimes on the œsophagus.

They may be completely latent, as regards symptoms, until they encroach upon the thoracic space sufficiently to interfere with respiration. Hurried breathing and a sense of the want of breath on exercise are the first manifestations of trouble. A further increase of the tumors in size causes habitual increase in the frequency of the respirations and dyspnœa. Much cough and expectoration render probable secondary growths in the pulmonary organs.

Other symptoms arise from obstruction of the parts just named. Pressure on the trachea and bronchi produces labor of breathing; on the vena cava, innominata, and subclavian veins, its effects are congestion of the head and the upper extremity on either one side or on both sides, cyanosis and sometimes œdema; on the œsophagus it obstructs deglutition.

The lateral extension of the tumors is determined by percussion and auscultation; their limits may be defined by the signs furnished by these methods. The irregular boundaries of the tumors, their extension in some cases on both sides of the chest, the enlargement being especially of the upper part, and the pushing forward of the sternum, together with the pressure upon the air-tubes, veins or œsophagus, are diagnostic points which distinguish mediastinal tumors from pleurisy with effusion, empyema and chronic pneumonia. Aneurismal tumors are to be excluded by the absence of their diagnostic characters.

The object of treatment is to render the tolerance as good and as long as possible, by palliative measures and those which tend to maintain the general health of the patient.

PARASITIC PRODUCTIONS.—The only parasitic production which it is important to notice in this work, is the Hydatid or Echinococcus Hominis. Over an area corresponding to the space occupied by a hydatid cyst, if it be of considerable or moderate size, there is dulness on percussion with suppressed or feeble bronchial respiration, and either weak bronchophony or diminished vocal resonance. The vocal fremitus is diminished. The situation of the cyst is generally in the lower lobe, and, hence, these signs are found in the middle or inferior third. The cyst may attain to such a size that the affected side of the chest is enlarged, the heart displaced and the diaphragm depressed. The signs are then those of pleurisy with effusion. The diagnosis can only be made positive by puncturing the chest and obtaining a serous liquid which is found to contain the scolices or hooklets of echinococci. The diagnosis is impracticable if, as may happen, pleurisy with considerable effusion coexist. It is also impracticable in cases in which the affection leads to perforation of lung and pleurisy with pneumo-thorax.

An hydatid cyst of moderate size, especially if seated in an upper lobe, gives rise to signs which are likely to be considered as denoting phthisis. The only positive proof of the affection is the expectoration of sputa containing the scolices of echinococci. The contents of the cyst are sometimes expectorated when there had been no suspicion of any important affection. From the proof of an hydatid cyst afforded by the sputa, however, it is not to be inferred that the seat of the parasitic production is pulmonary. The contents of hydatid cysts seated in the liver, like hepatic abscesses, may be discharged through the bronchial tubes. This, indeed, occurs oftener than the development of an hydatid cyst in the lungs.

Recovery takes place in a certain proportion of the cases of hydatid production within the lungs, but the prognosis is doubtful. The physician can promote recovery only by palliative and sustaining treatment.

Animal parasites other than echinococcus, and vegetable parasites are practically of very little importance owing to their infrequency, and, in general, their innocuousness.

A specimen of a very rare animal parasite, the Pentastoma constrictum, was sent to the author by Dr. M. M. Campbell, of Albana, Mo., which had been expectorated by a patient under his observation. The patient at different times expectorated this parasite in large numbers. The physical signs of a large cavity at the apex of the left lung were found in this case.[1]

---

[1] For a report of this case *vide* N. Y. Med. Record, Jan. 13th, 1877. For an account of the parasite *vide* Aitkin's Practice, vol. i.

IV.

FUNCTIONAL AFFECTIONS OF THE RESPIRATORY ORGANS WITHIN THE CHEST.

HYDROTHORAX, PULMONARY ŒDEMA, ASTHMA, BRONCHIAL HEMORRHAGE, PLEURODYNIA AND DORSO-INTERCOSTAL NEURALGIA, PARALYSIS OF THE DIAPHRAGM, TONIC SPASM OF THE DIAPHRAGM, CLONIC SPASM OF THE DIAPHRAGM (HICCOUGH).

AFFECTIONS which are not inflammatory, and which do not involve appreciable change in structure, are denominated functional. With this definition, under the above heading are embraced, hydrothorax, pulmonary œdema, asthma, bronchial hemorrhage; and it is convenient to include pleurodynia and intercostal neuralgia, together with paralysis and spasm of the diaphragm.

HYDROTHORAX.

Hydrothorax is a dropsical effusion into the pleural cavities. The name should not be applied to an effusion dependent on pleurisy. The affection is always bilateral, with this exception: The pleural cavity on one side having been obliterated by old pleuritic adhesions, the dropsical effusion may take place into the air cells on that side (pulmonary œdema), hydrothorax existing on the opposite side. An instance of this kind has fallen under the author's observation. Hydrothorax very rarely, if ever, occurs independently of general dropsy. It is therefore dependent in the great majority of cases on either renal or cardiac disease, or on both combined. Mitral obstructive lesions especially favor effusion into the pleural cavities.

The presence of liquid in the pleural cavities is easily determined by physical signs which were stated in connection with the diagnosis of pleurisy with effusion (*vide* page 110). The liquid in dropsy always changes its level with the change of position of the body from the vertical to the horizontal.

The presence of liquid in both pleural cavities is, of course, sufficient to exclude unilateral pleurisy. Bilateral pleurisy with effusion is extremely rare, and is always associated with tubercles or pulmonary phthisis. The presence or absence of phthisical symptoms, and of general dropsy, suffice for the differential diagnosis.

The purely serous character of the effused liquid may be ascertained by an exploratory puncture.

The treatment is that indicated in cases of general dropsy. A large accumulation of liquid in both pleuritic cavities causes embarrassment of breathing, and may endanger life. In the way of medication, elaterium is the most efficient remedy for diminishing promptly the quantity of liquid. Aspiration, however, is more prompt in affording relief, and there is no objection to its employment on one side or on both sides.

In dropsical effusion, the liquid may be entirely withdrawn by aspiration, without giving rise to troublesome cough, or suffering from the rapid expansion of the compressed lung.

Pulmonary Œdema.

Œdema elsewhere than in the lungs, is a dropsical effusion into the areolar or connective tissue. In pulmonary œdema the effusion is within the air cells. Clinically, the affection is presented in two forms, namely, subacute or chronic, and acute œdema.

In acute œdema, the air cells are rapidly filled with serum, giving rise to panting respiration, great dyspnœa, and lividity. There is usually cough, with an abundant expectoration of frothy serum which is sometimes tinged with blood. The attack may be sudden, and it may terminate fatally by apnœa within a short period, even a few minutes.

The following is an illustration of the suddenness and severity of an attack. A middle aged gentleman, apparently in good health, while at supper, was seized with dyspnœa, which increased so rapidly that in a few moments his suffering was extreme, and he seemed in danger of dying from suffocation. The physical diagnosis of œdema was made, and in an hour or two the symptoms were relieved. On the following day there was no trouble with respiration, and he resumed his usual condition of health. An examination of the urine gave evidence of renal disease. He subsequently died from uræmic poisoning.

Acute œdema occurs in connection with mitral stenosis and renal disease, or with these two affections conjoined. It is especially connected with the contracted or cirrhotic affection of the kidneys. If the existence of either of the two affections just named be known, the pulmonary symptoms render the diagnosis probable. A positive diagnosis, however, is readily made by a physical exploration of the chest. The presence of liquid in the air cells causes dulness on percussion, which, as the œdema is bilateral, exists on both sides. The dulness is especially marked posteriorly, and at the lower part of the chest. The dulness is associated with feebleness or suppression of respiratory sound. Vocal resonance and fremitus are not increased. The diagnostic sign, taken in connection with other signs, is the presence of fine moist râles more or less diffused over the chest on both sides. A crepitant râle is sometimes heard in combination with the moist râles.

The signs differ from those of hydrothorax in these regards: There is flatness instead of dulness in the latter affection below the level of liquid. The presence of liquid is demonstrated by the proof of its change of level, with change of the position of the trunk. In œdema the vocal resonance and fremitus may show that the lungs extend to the base of the chest. The moist râles are either wanting in hydrothorax, or, if present, they are not abundant, and are not heard at the base of the chest. It is, however, to be considered that œdema of the lungs may occur in connection with general dropsy and more or less effusion into the pleural cavities.

Capillary bronchitis, which is also characterized by moist bronchial râles on both sides of the chest, is excluded by the absence of symptoms denoting an inflammatory disease. Moreover, in bronchitis, dulness on percussion is wanting.

Subacute or chronic pulmonary œdema differs from the acute form only in the amount and extent of the serous transudation. The physical signs are the same, but less marked and diffused. Œdema of the posterior portions of the lungs is apt to occur in diseases attended with exhaustion and requiring recumbency on the back. The transudation, under these circumstances, is an effect of hypostatic pulmonary congestion. More or less œdema is of frequent occurrence in connection with diseases of the heart and kidneys, and may account for the want of breath on exercise or habitual dyspnœa in cases of these diseases. In some cases the œdema persists for a long period, continuing until a fatal termination to which it contributes.

Acute pulmonary œdema calls for prompt treatment. Bloodletting is the most promptly efficient measure, and may sometimes prevent death. Next in efficiency is the application to the chest of a considerable number of dry cups. They should be followed by sinapisms to the chest. Warm, stimulating pediluvia are serviceable, and may be employed while the cups are applied. An active hydragogue is to be given if speedy relief be not obtained by the foregoing measures, and, of hydragogue remedies, elaterium is the most prompt and efficient. After relief has been procured, the indications for treatment relate to the pathological conditions and circumstances which the etiology of the œdema involves. These indications govern the treatment in cases of subacute and chronic œdema. To avoid hypostatic congestion and œdema, the position of the patient should be frequently changed in order to prevent gravitation of blood to the posterior portions of the lungs. The author has observed notable relief in acute œdema from the inhalation of oxygen.

ASTHMA.

The term asthma or bronchial asthma, denotes an affection, the symptomatic features of which are as follows: It is a paroxysmal affection, the paroxysms characterized by labored breathing, the acts of respiration not increased, but often diminished in frequency, the expiratory act prolonged, the breathing giving rise to wheezing sounds heard at a distance from the chest, the dyspnœa preventing recumbency and attended with a craving for pure cold air. The paroxysms vary much in duration as well as severity, lasting in some cases only a few moments, and in other cases many days or even weeks. When the duration of an attack is thus extended, exacerbations occur, and their occurrence, as also of the paroxysms, is more frequently in the night than in the daytime. The affection is unattended by fever.

This summary embraces points which are diagnostic; but the diagnosis is made positive by a physical exploration of the chest. Inspection generally furnishes the signs which are characteristic of emphysema; the emphysematous condition in fact exists transiently, if emphysema be not, as it often is, a persistent affection. Dulness on percussion being wanting, the vocal resonance and fremitus of health remaining unaffected, pleuritic effusion and pulmonary œdema are thereby excluded. Sibilant and sonorous râles are heard on auscultation usually in great abundance, and diffused over the chest and on the sides. These signs exclude laryngeal and tracheal obstruction. The dyspnœa due to cardiac disease (which has sometimes been called cardiac asthma) differs in being less labored, the voluntary force being exerted on the inspiration, and the dry bronchial râle are not present in the same abundance. Moreover, cardiac disease sufficient to account for the dyspnœa is excluded by the absence of diagnostic physical signs.

Although not essential, bronchitis in most cases accompanies asthma; and in a primary attack, especially in childhood, capillary bronchitis is to be excluded. Capillary bronchitis is an acute inflammatory affection with fever more or less intense; the respirations are notably frequent, and fine moist bronchial or subcrepitant râles are heard over the chest. Asthma, on the other hand, is a non-inflammatory affection without fever, the respirations are diminished, and the dry bronchial râles are heard over the chest. These points are ample for the differential diagnosis.

Excepting a primary attack, inasmuch as the paroxysms of asthma are generally recurrent, and the liability of the patient thereto is known, the diagnosis in most cases hardly admits of question.

TREATMENT OF ASTHMA.

The objects of treatment during a paroxysm of asthma are palliation of the dyspnœa, and either cutting short the paroxysm or rendering its duration as brief as possible. There are several remedies by means of which sometimes these objects are accomplished. The remedies are by no means uniformly efficient. A remedy which in one case proves successful, in another case is without any good effect. The remedy by which an attack is speedily arrested fails when the same patient has a subsequent attack. The probable efficiency of any of the remedies in any case cannot be foreseen. The affection in some instances resists all remedies.

Nauseant remedies often afford relief. Ipecacuanha and the tartrate of antimony have been found useful, but, at the present time, they are rarely given in this affection. The lobelia inflata, which was formerly, in this country, much in vogue as an asthmatic remedy, has fallen into disuse, although often affording much palliation, on account of the distressing nausea which it produces, and because other remedies are more efficient. A certain measure of relief is obtained by smoking ordinary tobacco.

The author has known of repeated instances in which full doses of quinia, that is, from twenty to thirty grains to an adult, have promptly arrested a paroxysm. There can be no objection to a trial of this remedy. An opiate will not infrequently render a paroxysm abortive. The effect is, of course, more quickly produced if it be given hypodermically. Belladonna or atropia belongs among the remedies which will sometimes either cut short the paroxysm or diminish notably its severity. To secure a full effect, atropism should be induced. The inhalation of the vapor of chloroform, or of sulphuric ether, is sometimes immediately successful; the breathing may become easy, and the bronchial râles disappear after a small quantity has been inhaled. The ethers given internally often afford palliation. The nitrite of amyl, inhaled, affords temporary relief, and sometimes arrests the paroxysm. The hydrate of chloral has been found successful in some cases. Stramonium is a remedy which often brings speedy relief. The best method of using this remedy is by smoking the dried leaves in a pipe, or prepared in the form of cigarettes. Inhaling the fumes of paper saturated with the nitrate of potassa, or of pastilles containing this remedy, is a popular mode of palliation which is oftentimes effective. Black coffee of good strength, some patients find a palliative of no inconsiderable power. Inhaling compressed air and expiring into rarefied air, are extolled by German writers as an effective method of treatment especially if the asthmatic paroxysm be associated with bronchitis. Some patients find relief from the inhalation of oxygen. Bartholow has found galvanization of the pneumogastric nerves to produce remarkable results in some cases, but failing completely in other cases, the positive pole being placed beneath the mastoid process and the negative pole to the epigastrium. This author states that Faradism is not serviceable. In the selection from these remedies of those to be first employed, and in deciding upon the order in which they are successively tried, the practitioner must exercise his judgment aided by his clinical experience and the past experience of the patient.

Prophylaxis is an important object in the treatment of asthma. In the majority of cases the affection is associated with, and in a measure dependent upon, chronic bronchitis. Much will be accomplished in these cases in preventing the recurrence of the paroxysms, by the successful treatment of the bronchial inflammation. The iodide of potassium in some cases is a remedy of marvellous potency in the prophylactic treatment. Some patients are rendered quite secure against attacks by the persistent use of this remedy, and it may be continued in moderate doses for an indefinite period if well tolerated. A troublesome pustular eruption is of little account in contrast with the recurrence of asthma, and in some cases, the remedy, after a time, ceases to have this inconvenience. The other remedies which experience shows to have a curative influence over chronic bronchitis are useful as prophylactics.

Attacks of asthma are sometimes attributable to special causes which involve peculiar idiosyncrasies; for example, asthma may be caused by emanations from feathers, and by no other cause. With reference to prophylaxis, therefore, each case should be studied with a view to discover a particular exciting cause.

If prophylactic management be without avail, and the paroxysms recur frequently, an important question relates to a change of residence. As is well known, a change from the city to the county, or *vice versâ*, from the sea-side to an inland situation, from a moist to a dry atmosphere, or from the valley to a mountainous region, may render a patient exempt from the affection. There is no uniform rule as regards climatic influences, but it may be stated that every asthmatic may find some spot on the face of the globe where he can reside with comparative comfort. It is claimed by the physicians in Colorado that in that portion of our country the climate affords almost complete security against asthma. But protection is not derived from a temporary sojourn there or elsewhere; the change of climate, to be effectual, must be permanent, and, hence it is a question of importance to patients to discover a situation in which exemption is secured with the least sacrifice of personal happiness or interests. This question is to be setled by experience in each individual case. In general, an elevated situation, a dry atmosphere, uniformity of temperature, are the climatic elements which are antagonistical to asthmatic paroxysms; but often a change to a situation not combining these elements is efficacious.

BRONCHIAL HEMORRHAGE.

Bronchial hemorrhage, or hæmoptysis, in the great majority of cases is evidently a symptomatic event. It occurs in cases of pulmonary gangrene, hydatids, embolic pneumonia, pneumorrhagia or pulmonary apoplexy, and especially in both pneumonic and fibroid phthisis. It is a symptom in so large a proportion of cases of phthisis, and, comparatively, is so infrequent in other pathological connections, that it is always to be regarded as presumptive evidence of a phthisical affection. Clinical observations show that when it is not accompanied by other symptoms or signs denoting phthisis, patients become phthisical sooner or later, in a considerable proportion of cases, and that it is of practical importance to consider it in the light of a premonition of that disease. It is also a symptom in cases of mitral cardiac lesions. It is sometimes, but very rarely, a vicarious hemorrhage in cases of suppressed menstruation. But there are cases in which it is neither accompanied nor followed by any appreciable disease with which it can be supposed to be connected; and in these cases it must be considered as an individual or substantive affection.

In another work the author has reported cases in which hæmoptysis recurred daily, or after very short intervals, for a series of months, and even years, together with cases in which, after longer intervals, a great number of attacks had taken place, other symptoms and the physical signs of pulmonary and cardiac disease being absent, and no affection of these organs becoming developed. There was no evidence in these cases of any morbid condition to which the hemorrhage could be referred.[1] The instances in which the hæmoptysis is to be regarded as idiopathic are rare, but the fact of their occurrence is not to be lost sight of in diagnosis and prognosis.

In cases of hæmoptysis, whenever there is room for the question whether or not it be a symptomatic event, evidence of the affections severally with which it may be connected as a symptom is to be sought after. Confirmed or advanced phthisis, embolic pneumonia, pulmonary apoplexy, and cardiac disease are excluded by a negative result of the physical exploration of the chest. If the menses be not suppressed, the hemorrhage is not vicarious. Incipient phthisis is probable if cough and loss in weight have preceded the hemorrhage, although the diagnosis cannot be made positive by means of physical signs; but in the great majority of cases, if phthisis exist, the physical diagnosis is practicable. Assuming that careful explorations of the chest are negative, and that there are no symptoms of incipient phthisis other than the hemorrhage, it must be recollected that the latter is not infrequently a premonitory event, and that it is proper to consider it in that light in every case in which there is no other explanation of its occurrence, and especially if the age of the patient be at the period of life when phthisis is most apt to occur, namely, between twenty and thirty. The fact of its being a forerunner of that disease cannot, of course, be determined, in individual cases, until after the lapse of a certain period of time; meanwhile, it is the part of prudence for the patient to adopt prophylactic measures as if phthisis were impending.

---

[1] Phthisis, in a Series of Clinical Studies, 1875, page 85.

The diagnostic characters of bronchial hemorrhage have been already stated (*vide* page 64). There is little liability to error, in this regard, if the blood be seen, and still less if it be raised in the presence of the physician. A source of error not before mentioned is deception on the part of the patient. Criminals, soldiers, and hysterical women sometimes feign hæmoptysis either by producing hemorrhage within the mouth, or by mixing blood with the expectoration. The size and form of the blood-corpuscles, as seen by the microscope, may perhaps show that the blood is not human. The quantity of blood expectorated is often much exaggerated, in some cases with an intention to deceive, but oftener because the quantity is over-estimated. Spitting blood usually occasions much alarm, and allowance is to be made for the moral influence in estimating its effects. If the rupture of an aneurism into the trachea or a bronchus be excluded, the hemorrhage, however profuse and persistent, very rarely endangers life. The loss of blood, however, is sometimes the immediate cause of death. Coagulation of fibrin in the bronchial tubes, in addition to the loss of blood, may determine a fatal termination. In a specimen presented by Dr. Finnell to the New York Pathological Society, the bronchial tubes of one lung were filled with coagulated fibrin, phthisis not existing. In this case the patient, who had previously had hæmoptysis repeatedly, was attacked, while apparently in vigorous health, with profuse hemorrhage, and died within a few days after the attack.

The practice formerly in vogue of abstracting blood by venesection, cups, or leeches, in order to arrest profuse bronchial hemorrhage, has become nearly obsolete. It was doubtless sometimes effective, but perhaps with as much expenditure of blood as if the hemorrhage had been allowed to continue. At all events, there is an incongruity in the employment of bloodletting to prevent the loss of blood. Whatever benefit was derived from the abstraction of blood can be obtained by measures which do not involve an expenditure of it. Dry cupping, sinapisms, and stimulating pediluvia, are sometimes sufficient. A measure more potential than bloodletting is the ligation of one or more of the extremities, interrupting the flow of blood in the veins without obstructing the arterial current. The author has witnessed the almost immediate arrest of profuse hæmoptysis by this measure. The ligatures should be loosened when the hemorrhage ceases, leaving them in place to be tightened whenever it recurs. This measure is to be employed only when the physician is present, especially if two or more of the extremities are ligated; and the pulse or the heart's action should be watched, lest syncope ensue. The ligation should not be long continued, in view of the possible danger of thrombus of veins, and subsequent embolism. The direct application of cold to the chest is also a measure of potency, and, if judiciously regulated, unattended by danger. Relays of napkins dipped in ice-water may be applied after intervals of a few moments, or pounded ice in a bladder or caoutchouc bag may be applied over the site of the hemorrhage as determined by the presence of fine bubbling râles. Ergot is a valuable hæmostatic remedy. The author has seen recurring profuse hæmoptysis repeatedly arrested by this remedy. It should be given in full doses, repeated after short intervals, for example, a drachm or two of the fluid extract every half hour or hour. If not tolerated by the stomach, half an ounce may be given per enema. It is generally advisable to give an opiate either by the mouth or rectum, or hypodermically, and to maintain a certain amount of anodyne effect. Gallic acid and the acetate of lead have a hæmostatic effect, but far less than ergot. They may be advantageously combined with opium. Monsel's solution largely diluted, in the form of spray, inhaled, has been found successful in arresting the hemorrhage. Table salt in teaspoonful doses, taken into the mouth dry and swallowed, is a popular remedy for hæmoptysis in all countries. Graves claimed for this remedy much efficiency. It is certainly harmless, and serves to occupy the attention of the patient until other measures are directed by the physician. Cardiac sedatives, digitalis, aconite, and the veratrum viride, are indicated if the action of the heart be increased in frequency without being greatly weakened.

The foregoing are measures of treatment when the hæmoptysis is profuse. Quietude is to be enjoined. The atmosphere of the apartment should be cool. Drinks and food should be taken cold. With a view to allaying undue nervous disturbance arising from alarm, the patient should be assured that there is very rarely any immediate danger from the hemorrhage, however profuse, and that in the majority of cases it is not followed by any evil effects. In cases of phthisis it appears to be often useful.

Bronchial hemorrhage, when moderate or slight, does not call for the active treatment indicated when blood is profusely expectorated. A few cups to the chest, sinapisms, or flying blisters, ergot in moderate doses, gallic acid or the acetate of lead with opium, the oil of turpentine, and the astringent preparations of iron, taken into the stomach, constitute the treatment. It is not important to enjoin absolute rest, nor a rigid diet. It is questionable whether it be always desirable to arrest a slight or moderate hæmoptysis, irrespective of its influence on the mind of the patient. Over-medication, low diet, and confinement to the bed, favors in the mind of the patient an exaggerated idea of the gravity of the hemorrhage, and do much harm by their direct depressing effect upon the body. As a rule, moderate or slight hæmoptysis is vastly more important in relation to diagnosis than to therapeutics.

PLEURODYNIA AND DORSO-INTERCOSTAL NEURALGIA.

Pleurodynia, a painful affection of the thoracic muscles (myalgia), and intercostal neuralgia, a neuralgic affection of the intercostal nerves, have a resemblance to pleurisy and pneumonia in respect of the character, and sometimes the intensity of the pain. A diagnostic test of intercostal neuralgia is tenderness at one or more of the intercostal spaces near the sternum, in the axillary or infra-axillary region, and close to the spinal column. The tender spots are sometimes found in two, and wanting in the third, of these three situations. Both affections are unattended by fever unless by accidental association. The differential diagnosis is made positive by the absence of the physical signs of pleurisy or pneumonia.

Intercostal neuralgia occurs not infrequently in cases of phthisis, and is to be distinguished from the dry circumscribed pleurisies which are common in that disease. These intercurrent pleurisies are mostly at the upper part of the chest, and the pain is referred to the infra-clavicular or the scapular regions, whereas, generally, in intercostal neuralgia the pain is referred to the middle or lower portion of the chest.

A myalgic pain, slight or of moderate intensity, is not infrequently seated in the præcordia, and leads patients to apprehend disease of the heart.

The pain, if sufficiently intense to call for opiates, is thereby promptly relieved. The intensity of pain is rarely sufficient to require large doses, and in the majority of cases it occasions only more or less inconvenience. Sinapisms, a belladonna plaster, or the chloroform linament often suffice to meet the indication offered by pain. The curative treatment is the same as in other neuralgic affections. Full doses of quinia, continued for several days, will often prove effectual. Small blisters may be applied over the painful spots in intercostal neuralgia, if the affection persist.

Paralysis of the Diaphragm.

Paralysis of the diaphragm is very rarely a substantive affection, but it is a pathological event occurring in connection with different affections, namely, peritonitis, pleurisy, progressive muscular atrophy, and general spinal paralysis. The paralysis may be bilateral or unilateral. Unilateral paralysis may occur in pleurisy, and from injury or compression of the phrenic nerve. Bilateral paralysis is a rare manifestation of hysteria. The symptoms are want of breath on exercise, dyspnœa, and increased frequency of the respirations. The voice is weakened, and the patient is unable to speak continuously. The cough is weak, and the act of expectoration difficult. If there be no pulmonary affection, the respiration is carried on by the costal muscles without much inconvenience; but if bronchitis, pneumonia, or other diseases of the lungs occur, the labor of breathing and the difficulty of expelling morbid products from the air passages, render the condition of the patient serious.

The diagnostic evidence is retraction of the epigastrium, and the latero-inferior portion of the chest, on one or both sides in the inspiratory act, together with increased movements of the costal muscles. In order for those signs to be evidence of paralysis of the diaphragm, certain pulmonary morbid conditions are to be excluded, namely, pleuritic effusion, empyema, pneumonia, etc. Immobility of the diaphragm from mechanical pressure in hydro-peritoneum, pregnancy, in tympanitic distension of the abdomen, and in cases of abdominal tumors, is, of course, not to be considered as evidence of paralysis. Aside from indications relating to morbid conditions with which the malady is connected, the treatment consists in electrization with either the constant or interrupted current. In order to pass the current through the phrenic nerves, one pole is to be placed upon the neck, and the other to the lower part of the chest.

Tonic Spasm of the Diaphragm.

This affection must be extremely rare. The author has never met with an example. The symptoms are orthopnœa, cyanosis, feebleness of the voice, together with severe pain in the epigastrium and the latero-inferior portion of the chest. Death may take place from apnœa.

The signs are expansion and immobility of the lower part of the chest, respiration being performed with the costal muscles.

The diagnosis is to be based on these symptoms and signs, pulmonary affections and peritonitis being excluded.

The affection has been observed in cases of muscular and articular rheumatism. It occurs in tetanus.

The immediate object of treatment is the relief of the spasm. This is to be effected by the inhalation of chloroform, hypodermic injections of morphia, and revulsive applications to the chest.

Clonic Spasms of the Diaphragm. Hiccough.

Hiccough represents spasm of the diaphragm. This is hardly to be considered as an individual disease, but it is a symptom in various affections, and occurs without any apparent pathological connections. Persisting, as it sometimes does, for days and weeks, it is a source of much distress, and induces exhaustion by interfering with sleep. It is often a source of much annoyance to the practitioner, from its resistance to measures of treatment. Relief is sometimes obtained by antispasmodic remedies, namely, ether, the compound spirits of lavender, valerian or the valerianate of zinc, assafœtida, etc. Belladonna or atropia has been given with success. The salts of morphia or codeia not infrequently relieve promptly. If these remedies prove unsuccessful, the inhalation of chloroform or ether, carried to the point of slight anæsthesia, may be tried. Compression of the epigastrium by means of a compress, the lower part of the chest being also compressed by a bandage, is sometimes effective. Finally, electricity should be resorted to, if the hiccough persist. Both the continued and interrupted current have been found efficient.

V.

DISEASES OF THE LARYNX.

ADOPTING essentially the classification of the diseases within the chest, those seated in the larynx are: 1st. Acute and subacute laryngitis. 2d. Chronic laryngitis. 3d. Œdema of the glottis. 4th. Morbid growths; and 5th. Functional diseases, namely spasm and paralysis of laryngeal muscles.

ACUTE AND SUBACUTE LARYNGITIS.

In the great majority of the cases of acute and subacute laryngitis, the anatomical characters are the same as in the ordinary form of inflammation of the mucous membrane in other situations. An important deviation from this ordinary form, in the larynx as elsewhere, is a fibrinous exudation upon the mucous surface. This anatomical feature gives to laryngitis symptomatic characters which do not belong to it in its ordinary form, and it has an important bearing on the prognosis. As a variety of laryngitis, this form is distinguished by different terms, namely, croupous, diphtheritic, plastic, fibrinous and pseudo-membranous. The term last named is as unexceptionable as any, and is therefore selected. Pseudo-membranous laryngitis will be considered, as a variety of laryngeal inflammation, under a separate heading. The ordinary form of laryngitis is distinguished by German writers as catarrhal inflammation of the larynx. For reasons already mentioned, this name is not adopted; the terms simple, acute, and subacute laryngitis, in the opinion of the author, are to be preferred.

SIMPLE ACUTE AND SUBACUTE LARYNGITIS.

A simple subacute laryngitis is one of the local manifestations of "a cold." It is generally preceded by coryza and followed by bronchitis. The inflammation, however, in its course downward from the nasal mucous membrane, may stop at the larynx, and it may be arrested by abortive treatment at this situation. It does not involve obstruction; the inflammation very rarely becomes acute; there is little or no tendency to œdema of the glottis, and it almost never eventuates in chronic laryngitis. As a rule, therefore, it is devoid of gravity. The treatment is that indicated in bronchitis. The diagnosis is attended with no difficulty. The symptom on which the diagnosis rests relates to the voice. The voice is hoarse or husky. The laryngoscope may be used to exclude pseudo-membranous laryngitis. In some cases of the latter variety the inflammation is not markedly acute. The absence of an exudation in the throat, however, renders it extremely improbable that a false membrane is present in the larynx.

That laryngitis, however slight, affects the voice is an important fact in relation to the exclusion of laryngeal inflammation. On this fact is based the rule that, if the voice, or in infants the cry, be not affected, laryngitis may be excluded. If there be exceptions to this rule, they are exceedingly infrequent. It is a great advantage to be able to decide in an instant that laryngitis does not exist, when symptoms, other than those pertaining to the voice, might lead to a suspicion of that affection. Parents and nurses may oftentimes be spared needless anxiety as regards the importance of diseases affecting the air passages in children, by a knowledge of this rule.

Laryngitis is acute when, in connection with notable hoarseness, huskiness, or extinction of the voice (aphonia), there is more or less symptomatic fever, and labored breathing from laryngeal obstruction. The obstruction causes suffering from dyspnœa and endangers life. Simple acute laryngitis in the adult is an affection of great gravity. It is not infrequent in childhood, but it is one of the rarest of diseases after adult age. It may destroy life within a few hours, the mode of dying being by apnœa.

The diagnosis involves the exclusion of œdema of the glottis and pseudo-membranous laryngitis. In œdema of the glottis, the obstruction is limited to the inspiratory act, whereas in laryngitis it is appreciable in expiration as well as in inspiration; and the tumors produced by the œdema, which are situated above the vocal cords, can be felt with the finger carried beneath the epiglottis. They may be seen by means of the laryngoscope if the embarrassment of breathing be not so great as to preclude its use. Pseudo-membraneous laryngitis is excluded by the absence of exudation in the pharynx, and, demonstratively, if a laryngoscopic exploration be practicable. In children the latter of these two affections alone is to be excluded, œdema of the glottis occurring so seldom in infantile life that the liability to it need hardly be considered.

Spasm of the muscles closing the glottis is incident in a greater or less degree to acute laryngitis. It enters more largely into the affection in children than in adults. With reference to prognosis and treatment, it is desirable to determine the amount of the obstruction due to this morbid condition. The increased obstruction which occurs in paroxysms or rather exacerbations, is caused by spasm, whereas, the amount when an exacerbation is not present, is caused by the swelling of the membrane, the submucous infiltration, and, perhaps, paralysis of the muscles which dilate the glottis. The latter conditions are represented by the degree of labor in breathing which is constant. A purely spasmodic affection is easily excluded by the absence of fever, the paroxysmal and violent character of the obstruction, and, if there be not subacute laryngitis, by the absence of huskiness or hoarseness of the voice or cry when the paroxysm is relieved. Affections of the lungs are excluded by the absence of their physical signs. The signs proper to the laryngeal affection are those which denote obstruction in the larynx. The respiratory murmur on both sides is enfeebled, and, if the normal intensity of the murmur prior to the laryngeal affection be known, the diminution of this intensity is a good criterion of the degree of the obstruction. If the obstruction be considerable or great, the signs on inspection are marked. The expansion of both sides of the chest is limited; the soft parts above the clavicles are depressed, and the antero-inferior portion of the chest is retracted during the act of inspiration.

Simple acute laryngitis in the adult claims prompt and active treatment, the danger being vastly greater than in the child, owing to the greater amount of obstruction caused by submucous infiltration. If the patient be robust, and the disease be without any complication contra-indicating bloodletting, this measure is advisable on account of the promptness of its effect. The danger of death being purely from apnœa, bloodletting is not open to the objections thereto in cases of a disease in which if it prove fatal the mode of dying is by asthenia. The use ot mercury may be advocated for the reason that the doctrine so long held of its antiphlogistic effect is probably not without some foundation; and in an inflammatory disease which threatens life by suffocation within a few days or even hours, the objections to this remedy do not weigh against it if it diminish in any measure the intensity of the inflammation or limit the quantity of its products. Calomel may be given either in full doses, with the addition of an opiate to prevent its operation as a cathartic, or in fractional doses after short intervals. The object being to induce rapidly mercurialization, inunction with an ointment or the oleate of mercury may be added. Ptyalism, however, is, if possible, to be avoided. Local measures of treatment, both internal and external, are important. The inhalation of warm vapor containing opium or some narcotic promotes resolution and relieves spasm. Externally both warm and cold applications are useful; the former have measurably the same effects as the inhalation of warm vapor, and the latter lessen hyperæmia and have a sedative influence upon the muscles. They may be employed in alternation, and in deciding to which the preference is to be given, the sensations of the patient and the apparent effects are to be the guides. Sinapisms to the neck are of service, but blisters or other means of active counter-irritation are objectionable.

The duty of resorting to tracheotomy as soon as it is evident that the foregoing measures of treatment will prove unavailing, admits of no doubt. The only question is, When should it be performed? If delayed too long, the probability of success is diminished. It should be resorted to as soon as the obstruction from the swelling of the membrane and submucous infiltration, that is, exclusive of spasm, produces lividity of the prolabia. It is a good practical rule that, whenever there is doubt whether or not the operation can safely be deferred, it should be performed, on the ground that to resort to it earlier than it is imperatively demanded, is far better than to postpone it too long. The operation may prove successful if resorted to even when the patient is moribund. This fact was exemplified a few days prior to the writing of this page, in the practice of Dr. Varick, of Jersey City. In a case of acute laryngitis, a rapid increase of the obstruction took place, and the trachea was opened after respiration had ceased, and the pulse was scarcely appreciable. The patient was restored to life by artificial respiration, and is now able to breathe freely through the natural passage, with the prospect of complete recovery.

The affection in children claims far less activity of treatment, inasmuch as the danger is comparatively small. Bloodletting and mercurialization may be dispensed with. Emetics should be employed if there be reason to suspect an accumulation of mucus in the larynx. The author has met with a case in which a mass of tenacious mucus in this situation caused death by suffocation in a child five or six years of age. An emetic in this case would have saved the life of the patient. Aside from emetics if required, the inhalation of some anodyne vapor, opiates in small doses to allay spasm, and warm or cold applications to the neck, are the measures of treatment indicated. The same principles are to govern the practitioner in relation to tracheotomy; but this operation is very rarely called for.

PSEUDO-MEMBRANOUS LARYNGITIS.

This important variety of laryngitis is one of the several affections which heretofore have been embraced under the name croup. It is the form of inflammation affecting mucous membranes, designated by German writers croupous, in contradistinction from catarrhal. If the term croup be used, it should be limited to this affection and not applied to the affections which were formerly called spasmodic and catarrhal croup. The latter have been distinguished as varieties of false croup. To distinguish it from these affections, the pseudo-membranous affection has been called true croup. Pathologically it has the same relation to simple laryngitis as the so-called plastic variety of bronchitis has to simple bronchial inflammation.

Pseudo-membranous laryngitis is a complication in a certain proportion of the cases of diphtheria. The latter belongs among general or constitutional diseases; it is an essential fever, whereas, pseudo-membranous laryngitis, when primary, is classed among the local diseases. It is a rare complication of scarlet fever. As an idiopathic local affection it occurs almost exclusively in childhood. Cases prior to two, and subsequent to seven, years of age, are extremely infrequent, although no period of life is absolutely exempt from a liability to its occurrence. It is an infrequent affection even between the ages just named.

As in simple acute laryngitis, the prominent local symptoms are those which arise from laryngeal obstruction, and the effect upon the voice and cough. The symptoms and the signs of obstruction need not be repeated. The voice, at first hoarse or husky, becomes high-pitched, and is at length extinguished. The cough, in the early part of the disease, is shrill or barking (the "croup cough," the characters of which are easily recognized after having been once heard) and afterward stridulous. These symptoms are generally developed slowly; hence, there is danger of the affection being overlooked prior to notable laryngeal obstruction. The characteristic cough is less marked than in an affection which is unattended by danger, namely, laryngeal spasm either with or without subacute laryngitis. With the local symptoms are associated those of symptomatic fever.

The diagnosis of laryngitis is easily made. The only difficulty is in discriminating the pseudo-membranous variety from the simple acute affection. The differential diagnosis, of course, hinges on the evidence of an exudative or pseudo-membrane within the larynx. If the interior of the larynx can be brought into view by means of the laryngoscope, the presence or the absence of this criterion is demonstrable; but in children, especially if there be much labor of breathing, a laryngoscopic examination is very difficult and often impracticable. If the demonstration by this method fail, the presence of a false membrane is to be inferred, *first*, from the degree of obstruction being greater than in simple acute laryngitis, provided the patient be a child; and *second*, from the presence of an exudation in the pharynx, which is determinable by inspection of the throat. The latter is by far the more reliable. Clinical observations show, that in the great majority of cases, an exudation visible in the pharynx accompanies pseudo-membranous laryngitis, exclusive of the occurrence of the latter as a complication of diphtheria. There are, however, some cases in which this evidence is wanting. In these cases a positive diagnosis cannot be made, independently of the laryngoscope, until portions of the false membrane have been expelled by coughing. In all cases the expectoration should be carefully examined with reference to this point. The portions of false membrane expectorated are sometimes rolled together with mucus into a mass which must be carefully unrolled in water, in order to determine its membranous character. This evidence of the affection is rarely obtained if the patient be under five years of age, on account of the expectoration being swallowed.

It must be expected that this affection will end fatally, after a duration of from three to five days, in the great majority of cases; but perseverance in judicious methods of treatment will save not a few lives. Bloodletting is inadmissible, the danger not being from the intensity of inflammation or its ordinary effects, but from its peculiar product, namely, fibrinous exudation. The great object of treatment is to promote the separation and expulsion of the false membrane. The most important of the means for this end is the constant inhalation of steam. The most efficient method of accomplishing this is to fill the apartment with steam, at the same time keeping the temperature of the apartment at from 80° to 90° Fahr. If practicable, a stove should be placed in the apartment, and water in a large vessel kept constantly at the point of ebullition. If this be not practicable, several kettles containing water should be heated in a fireplace, or by burning alcohol. There should be no intermission or relaxation of this measure of treatment until the patient is safe. To the presence of steam, as thus produced, may be added, with advantage, the vapor from slaking lime in the apartment. This vapor has a soothing influence, and, perhaps, is beneficial by dissolving, in a measure, the membrane. With a view to the latter effect, lactic acid and pepsin have been employed, but it is not certain that much is thereby accomplished. If oxygen be available, this is a useful auxiliary. Dyspnœa is undoubtedly relieved by breathing an atmosphere charged with this gas. The author has seen several cases in which the affection was brought to a favorable termination, the chief reliance having been upon these means.

Emetics are indicated when there is reason to suppose that the false membrane is separated, or that there is an accumulation of mucus in the larynx. Under these circumstances they may be repeated every six or eight hours. The emetics selected should be those which act promptly and efficiently without prolonged nausea or depression. The turpeth mineral, the sulphate of zinc and powdered alum are eligible emetics. Tartar emetic should not be employed. The vital powers should be sustained by alimentation and alcoholics.

Tracheotomy has saved lives which otherwise would have been lost. This statement cannot be doubted. It is, therefore, a duty to resort to the operation whenever symptoms render it probable that the treatment otherwise will prove unsuccessful, without raising a question as to the percentage of successful cases. If by means of this operation only one case in a hundred were to recover, the duty of resorting to it is not less imperative than if fifty per cent. of patients were thereby saved from death. The result of the operation will depend greatly on its timely performance. Even if life be not saved by it, relief of dyspnœa is procured, and the mode of dying by asthenia is substituted for that which involves most suffering, namely, slow suffocation. Surgeons are sometimes reluctant to perform tracheotomy in this affection, believing that chances are much against its success, and apprehensive lest the death be imputed to the operation. The latter is an unworthy sentiment; but to meet it, statistics may be cited to show a fair percentage of successful cases. Steiner, in his article on croup, in Ziemssen's *Cyclopædia*, states that of 1698 cases collected by Duchek, a favorable result occurred in 428, a proportion of 1 to 3.9, or 25.2 per cent., "which," the writer adds, "is probably the correct average." The performance of the operation is often opposed by the parents or relatives of children suffering from this affection. The duty of the physician is then to state fairly and fully the grounds on which his opinion of its importance rests, thus relieving himself of responsibility for its non-performance.

CHRONIC LARYNGITIS.

There is but little liability to error in diagnosticating chronic laryngitis even without an inspection of the larynx. Either huskiness, that is, dysphonia, or, extinction of the voice, that is, aphonia, with an analogous modification of cough, are the diagnostic symptoms. Aphonia from paralysis of laryngeal muscles is to be excluded. This differential diagnosis may generally be made by attention to the following points of difference relating to the whisper: Aphonia from paralysis, or nervous aphonia, is characterized by a pure, soft whisper, whereas, when the voice is lost from the changes incident to laryngeal inflammation, the whispering sound is stridulous. If a patient with aphonia from laryngitis make an effort to speak above a whisper, the effort is obvious, and the stridulous character of the whisper is intensified: on the other hand, in nervous aphonia, the evidence of any effort is wanting, as it is when a patient exerts the will to move any voluntary muscles which are completely paralyzed. In cases of unilateral paralysis of muscles concerned in phonation, the voice is not lost, but there is more or less dysphonia if the character of the vocal sound be modified. In these cases the concomitant symptoms of laryngitis are wanting. Morbid growths within the larynx may interfere with vocalization. The laryngoscope renders the diagnosis positive by bringing into view appearances which denote inflammation, and by excluding paralytic affections or morbid growths.

If the epiglottis be involved in cases of chronic laryngitis, and especially if ulceration have taken place, dysphagia may be a prominent symptom, and, by interfering with alimentation, it is sometimes an important factor in determining a fatal termination.

With reference to prognosis and treatment, cognizance must be taken of the pathological connections of chronic laryngitis. In the great majority of cases it is associated with pneumonic phthisis; hence, it is always to be regarded as affording presumptive evidence of the existence of the latter disease. There are very few, if any, exceptions to the rule that whenever laryngitis has this connection, the pulmonary antedates the laryngeal affection. It is not difficult to understand that, without a physical exploration of the chest, the laryngitis may seem to precede the phthisical affection, inasmuch as the larynx not infrequently becomes affected before the pulmonary disease has made much progress, and moreover phthisis with chronic laryngitis may either undergo arrest, or progress very slowly. Under these circumstances, aside from the signs obtained by auscultation and percussion, laryngitis might appear to the physician, as well as to the patient, to afford an adequate explanation of all the symptoms.

Exclusive of phthisical laryngitis, in the majority of cases the affection is syphilitic. If, by the absence of the diagnostic symptoms and signs of phthisis, this disease can be excluded, the presumption is that the laryngitis is due to syphilis. The fact that syphilis preceded the laryngeal affection, is of course to be corroborated by the previous history and the confession of the patient. It is conceded by those who have given special study to laryngoscopy, that the differential diagnosis of laryngitis due to syphilis and phthisis, cannot be made positive by inspection of the interior of the larynx. Eliminating cases of phthisical and syphilitic laryngitis, the number of cases remaining is extremely small. Irrespective of these connections, the disease is very rare; but the fact is not to be lost sight of that there are cases without these or any other appreciable pathological connections. They may be distinguished as cases of simple, idiopathic, chronic laryngitis. They are more amenable to treatment, and the prognosis is much more favorable. Syphilitic laryngitis admits of curative treatment with a fair prospect of success, either with or without more or less permanent impairment of the voice. Phthisical laryngitis is very rarely cured, and complete restoration of the voice is not to be expected.

The treatment of chronic laryngitis is local and general. If it be connected with phthisis, general treatment having reference to the latter is important. If due to syphilis, anti-syphilitic treatment is essential. The measures indicated by these connections need not be here considered. Independently of these connections, indications derived from the coexistence of other affections, and the general condition of health, are by no means to be overlooked.

The local treatment consists especially of topical applications within the larynx. The laryngoscope is here of essential service, first, by enabling the practitioner to ascertain whether there be only redness and swelling of the membrane, or whether there be ulcerations, and if so, their situation and extent; and second, guided by the eye, he is enabled to make applications with precision, and he can observe their immediate local effects. If the inflammation be without ulceration, weak astringent solutions are to be applied either in the form of spray inhalations, or by means of a sponge, mop, or brush. A solution of tannin, from 5 to 10 grs. to the ounce, is most recommended. Bromide of potassium, common salt, chlorate of potassa, sulphate of zinc or copper, carbolic acid, and the iodide of potassium, all in weak solution, are among the great number of local remedies which are advised. Stronger applications should be tried if there be ulcerations. The most efficient is the nitrate of silver, applied in substance, or in a solution of 60 grains to the ounce. Other local remedies are strong solutions, either in water or glycerine, of tannin, the persulphate or perchloride of iron, the choride, acetate, or sulphate of zinc, alum, and the tincture of iodine.[1] Injections into the larynx, and the insufflation of remedies in the form of a powder, are inadmissible from the fact that their local action cannot be limited to the situation of the disease.

The author's opportunities for observing the results of topical treatment in phthisical laryngitis have been considerable. It undoubtedly procures relief and amelioration in a certain proportion of cases, very rarely, if ever, however, effecting a cure; but not infrequently the stronger applications increase the laryngeal symptoms. The employment of the latter judiciously, requires judgment and care. Treating the laryngitis in these cases as if it were the primary and important disease, is gratifying to the patient who is reluctant to accept the fact of the existence of phthisis. This is done by illegitimate specialists. The most charitable conclusion is that the practice betokens ignorance of the pathological connection of the laryngeal affection.

Topical treatment is especially important when the situation of ulcerations involves dysphagia. If the latter can be removed, the life of the patient is prolonged by the ability to take an adequate amount of food. In this respect the treatment has been of great value in cases which have come under the author's observation.

External local applications are of some utility in cases of chronic laryngitis. Severe counter-irritation is not advisable; but sinapisms, pustulation with the croton oil liniment, and small blisters seem to be sometimes of service. Wet compresses over the neck have often a soothing effect.

Laryngitis occurring in connection with phthisis very rarely gives rise to notable obstruction. Stenosis, sufficient to occasion difficulty in breathing, is, however, not uncommon when the affection is connected with syphilis, and not very infrequently tracheotomy is required. The author has met with a number of instances. By this operation not only is the patient rescued from impending death, but improvement may take place, and respiration through the larynx may be resumed. In a case under the author's observation this result followed, but after a time a second operation was required. The operation should be resorted to whenever the obstruction is sufficient to cause great suffering. The propriety of resorting to it in cases of syphilitic laryngitis, when stenosis does not exist, as a means of securing rest of the affected parts and thereby promoting healing processes, has been repeatedly advocated. Cases of its apparent utility have been reported.[1] From the difficulty of expectoration which is caused by an opening into the trachea, it is doubtful if the operation be expedient in cases of laryngitis associated with phthisis.

---

[1] For further details respecting remedies, the use of the laryngoscope, and the manipulations within the larynx, consult Cohen's treatise on Diseases of the Throat, etc., New York, 1872. For the strength of the solutions, etc., see Diseases of the Larynx, by Morell Mackenzie, M.D., in Reynolds's System of Medicine, Am. edition, vol. iii. page 432.

ŒDEMA OF THE GLOTTIS.

The term œdema of the glottis is here used to designate an affection characterized by serous effusion into the areolar tissue above the vocal cords, the seat being the aryteno-epiglottidean folds either on one or both sides, generally on both sides. The œdema sometimes involves the epiglottis. The submucous infiltration which forms an important anatomical element in cases of acute laryngitis in the adult, does not come under this heading. Laryngitis with submucous infiltration is called by some writers œdematous laryngitis, and the term œdema of the larynx is sometimes used as embracing both œdema of the glottis and the element of laryngitis just named.

In œdema of the glottis the effusion produces sacs or tumors which are situated on the top of the larynx, obstructing more or less the passage of air in the act of inspiration, but not interfering materially with expiration. The affection is not necessarily connected with laryngeal inflammation. The author has met with a fatal case in which the voice was unaffected, and the post-mortem examination revealed no appearances denoting laryngitis.

Its pathological connections must be known with a view to promptness in diagnosis and treatment. It is an occasional complication in cases of acute, subacute, and chronic laryngitis. It occurs, although so rarely that it is never anticipated, in cases of pharyngitis and tonsillitis. It is an excessively infrequent event in cases of the essential fevers. In the author's experience, the great majority of instances were in patients affected with renal disease. Occurring in this connection, it may, or may not, be associated with dropsical effusion in other situations or with general dropsy.

A fact of importance in its bearing on both diagnosis and treatment, is the rapidity with which the œdema sometimes occurs or increases. It may destroy life within a few hours, or even minutes, after the evidence of obstruction becomes apparent. As an illustration of the suddenness of death from an increase of the œdema, a case in hospital with moderate difficulty of respiration, the diagnosis being made positive, was placed under the special care of the ward nurse, with directions to call the resident house physician should the difficulty increase, everything being in readiness for the operation of tracheotomy. The house physician was summoned, but before the operation could be made the patient died from suffocation.

---

[1] *Vide* On Tracheotomy as a Means of Cure in Chronic Laryngeal Disease, by Thomas Bryant, Trans. Clinical Society of London, vol. i., 1868.

The diagnostic local symptom is the limitation of labored breathing to the inspiratory act. This, however, should not be relied upon exclusively in the diagnosis. The laryngoscope, if it can be employed, renders the diagnosis positive by bringing into view the œdematous swelling on one side or on both sides below the epiglottis. If there be much difficulty of breathing, however, the employment of the laryngoscope is by no means easy, and may be impracticable. The diagnosis is then to be made demonstrative by means of the touch. Carrying the finger below the epiglottis, the tumor or tumors may be felt. The voice will show whether or not there be laryngitis. Infancy and childhood are almost exempt from a liability to the affection.

A slight or moderate œdema may be treated with astringent topical applications by means of spray. If, however, the œdema be sufficient to occasion considerable embarrassment of breathing, topical applications are of little use, and internal medication of none whatever. Either the sacs containing the effused serum or the trachea must be opened. The walls of the œdematous tumors are sometimes so thin that rupture may be effected by pressure with the finger, or an incision may be made with the finger-nail. The late Dr. Buck resorted successfully in a number of cases to scarification, and he devised a knife suited for this purpose. A long curved bistoury, guarded up to very near the point, will, however, answer. It is to be introduced, guided by the finger, to the seat of the affection, and the tumor scarified. If the laryngoscope can be used, it will aid in guiding the knife to the right spot. This operation, as described, seems far easier than it appears in its performance. In a patient struggling for breath, the introduction of the finger and the knife into the throat adds not a little to the obstruction. It is not easy to direct the point of the knife with precision and to regulate the depth of the incisions. The hemorrhage is sometimes considerable, and the blood may flow into the bronchial tubes and accumulate there. Without great care there may be danger of wounding the vocal cords. Moreover, the effused liquid is sometimes gelatinous in its character, and does not escape after the incisions have been made. In view of these difficulties and dangers, tracheotomy is to be preferred. This operation will save the patient from death by this affection. It should certainly be performed whenever the obstruction is sufficient to occasion imminent danger of death. If the patient cannot be under constant observation, when the obstruction is considerable but not enough to involve immediate danger, it may be a question whether tracheotomy be not advisable, with a view to forestall a rapid, fatal increase of the œdema before the patient can be again seen. No comparison can be instituted between the risk of performing the operation when it might not have been required (which of course can never be demonstrated), and the risk of death from its non-performance.

In a very rare variety of laryngeal œdema the effusion is below the vocal cords. This is called subglottic œdema. It may occur in children, presenting the symptoms of fibrinous laryngitis or true croup. The diagnosis can only be made positive by means of the laryngoscope.

MORBID GROWTHS WITHIN THE LARYNX.

Recent writers on the diseases of the larynx call attention to the significant fact that morbid growths in this situation are now found to be of not infrequent occurrence, whereas, before the laryngoscope was added to the resources of clinical medicine, they were considered as extremely rare. Cohen states that prior to the introduction of laryngoscopy about seventy cases only were on record, while several hundreds have been recorded during the short period which has elapsed since that event. The laryngoscope has not only led to the recognition of intra-laryngeal morbid growths which were formerly overlooked, but it has made feasible surgical operations for their removal, which, without the advantage of ocular inspection, were impracticable. In view of these results, the affections embraced under this heading evidently belong to surgery rather than to medicine. They will therefore receive in this work only a passing notice.

Morbid growths within the larynx may be either benign or malignant. They are malignant in a small minority of cases. The benign growths differ in their pathological character, the larger number belonging to the class papilloma. These growths are associated with phthisis and syphilis in a considerable proportion of cases, the association with the former being the most frequent; but in the majority of cases there is no connection with either. They have their seat oftenest on the vocal cords. They may be either multiple or single; and they vary much in size and shape.

If the vocal cords be involved, the voice is more or less affected. The symptoms of laryngeal stenosis may, or may not, be present, and when present they denote, in different cases, varying degrees of obstruction dependent on the size and situation of the growths.

The diagnosis by means of symptoms requires the exclusion of chronic laryngitis. The exclusion of this affection is not readily made, and, moreover, laryngeal inflammation often, if not generally, accompanies morbid growths. Inspection by means of the laryngoscope can alone establish a positive diagnosis.

The removal of morbid growths within the larynx being purely surgical, the reader is referred to works on surgery or to those which treat specially of the subject.[1]

Foreign bodies may be lodged in the ventricle of the larynx, but generally they pass beyond the glottis, and lodge in the air passages below this point. The signs by which their situation is determined have been referred to in connection with obstruction of the trachea, and of a primary bronchus (*vide* page 127). The treatment belongs to surgery.

SPASM OF THE GLOTTIS.

Spasm of the muscles which approximate the vocal cords, namely, the arytænoideus, crico-arytænoidei laterales, and the thyro-arytænoides, as has been seen, is an element in simple and pseudo-membranous laryngitis. It is a prominent event in an epileptic paroxysm, explaining the noisy respiration and the congestion with lividity of the face which succeed the initial pallor. It is one of the multifarious manifestations of hysteria. In the latter connection it may possibly be confounded with œdema of the glottis. An instance of this error in diagnosis is as follows: Two young medical men were at a theatre when it was announced from the stage that one of the actresses had suddenly fallen ill, and the services of any physician present were requested. The two medical men at once saw the patient and found her apparently suffocating with laryngeal obstruction. They diagnosticated œdema of the glottis, and proposed an immediate resort to tracheotomy. The patient and her friends refused consent to the performance of this operation, and accordingly the medical men declined further attendance. Shortly after their departure, the patient was relieved, and on the following night she resumed her duties on the stage. The case was one of hysterical spasm of the glottis.

---

[1] *Vide* Treatise, by J. Solis Cohen, M.D., New York, 1872.

This error is to be avoided by following the rule that the diagnosis of œdema of the glottis should rest on the demonstrative proof afforded by either the laryngoscope or the touch. The coexistence of other hysterical phenomena, of course, renders it probable that the laryngeal affection is neuropathic.

As a substantive affection, spasm of the glottis is known as laryngismus stridulus and spasmodic croup.

Spasm of the glottis in comparatively a mild form occurs when infants are said to have spells of "holding the breath," dependent on an idiosyncrasy which is sometimes manifested soon after birth. During a paroxysm of crying the breathing is suspended for several seconds, the face becoming congested and cyanosed. The first inspiration which follows the suspension may be sonorous, and the breathing is afterward tranquil. The common method of relief is slapping the back or sprinkling a little water on the face. Care should be taken with children having this tendency to laryngeal spasm, to avoid, as far as practicable, the occasions for violent crying.

In a severer form the spasm constitutes the affection called laryngismus stridulus, thymic asthma, and internal convulsions. The affection occurs rarely before dentition or after the age of two years. Respiration is suspended for half a minute or longer; cyanosis is marked, and the countenance expresses great distress. What is known as carpo-pedal spasm, namely, flexion of the thumbs and the great toes, sometimes occurs; spasm of the facial muscles may be added, and in some cases general convulsions. The primary and most important event in these attacks is the laryngeal spasm. The paroxysms sometimes recur after intervals of varying duration; as many as fifty in the twenty-four hours have been observed. Death from apnœa may take place during a paroxysm, but the instances are rare. The recurrence of the paroxysms involves danger from cerebral congestion with effusion, and from exhaustion.

The diagnosis is not difficult. The age of the patient excludes œdema of the glottis. The suddenness and violence of the attack, the voice or cry having been previously unaffected, suffice for the exclusion of laryngitis. If there have been no previous attack, the circumstances connected with its occurrence are to be inquired into with reference to the inhalation of a foreign body; but generally the liability to the affection is known, previous attacks having been experienced.

The object of treatment during the attack is the cessation of the spasm. Sprinkling water on the face may at once succeed; if not, the fauces should be tickled with a feather, or the finger may be introduced into the throat, in order to excite retching or vomiting. After an attack, the object is to prevent recurrence. If the gums be swollen and tender, they should be freely divided, the incisions extending to the teeth. The child should be adequately nourished, and kept in the open air as much as practicable. All causes of mental or nervous excitement should be avoided as far as practicable. Tonic remedies are indicated if the digestion be imperfect and the blood impoverished. Remedies known as antispasmodics, namely, the bromine salts, valerian, assafœtida, and musk, may be given. In general, the administration of these per rectum is preferable to giving them by the mouth. The hygienic treatment, inclusive of alimentation, is of more importance than the employment of drugs, although the latter are by no means unimportant.

Occurring in children over the age of two years, spasm of the glottis is the chief pathological element in the affection commonly called spasmodic croup. This affection may, or may not, accompany subacute laryngitis. In the so-called spasmodic laryngitis, spasm is the source of the prominent symptoms. With or without laryngeal subacute inflammation, the affection is paroxysmal, the paroxysms taking place especially at night. The child is suddenly seized with embarrassed respiration, accompanied by the characteristic croup-cough, together with sonorous inspirations or stridulation. The laryngeal obstruction may cause facial congestion and cyanosis. This is the common form of false croup, and it occasions generally great and needless alarm. The surface of the body is cool, the pulse is small, and the thermometer shows little, if any, fever.

In order to relieve gratuitous apprehensions, it is desirable that the affection be promptly diagnosticated. Simple acute laryngitis and pseudomembranous laryngitis, or true croup, are to be excluded. This may be done instantly if the voice be unaffected and if fever be wanting. Subacute laryngitis is excluded by the absence of huskiness or hoarseness of the voice. And it is to be borne in mind that the affection has no tendency to eventuate in the so-called true croup.

The symptoms denoting obstruction of the larynx in the latter affection are developed slowly. Pseudo-membranous laryngitis never commences with a sudden, violent attack. The absence of exudation in the pharynx corroborates the diagnosis, and still more the absence of exudation in the larynx if laryngoscopy be practicable.

A mild emetic is followed by speedy relief, and is especially indicated if there be reason to suppose that the attack is caused by gastric indigestion. Sinapisms and warm applications to the neck often suffice for speedy relief. A sponge dipped in water as hot as can be borne, and applied to the neck, is an efficient remedy. To prevent recurrence of the paroxysms, some one of the antispasmodic remedies mentioned in connection with laryngismus stridulus may be given per enema.

Although exceedingly rare, cases of spasm of the glottis are occasionally met with in adults of both sexes, unaccompanied by other phenomena denoting hysteria. It is an occasional symptomatic event in cases of aneurism, the aneurismal tumor generally being seated near the connection of the transverse and descending portion of the arch of the aorta, producing in this situation irritation of the left recurrent laryngeal nerve. It may be due to a tumor not aneurismal, affecting either the right or the left nerve. Laryngeal spasm thus induced may recur at short intervals, and occasion serious interference with respiration. The author has met with several cases in which it had no appreciable pathological relations. In these cases a few paroxysms only occurred, and the affection was of brief duration, not proving serious, but giving rise to much apprehension in the mind of the patient. In these cases œdema of the glottis and laryngitis are to be excluded, as in cases of hysterical spasm, and the affection is not to be confounded with spasm of the diaphragm. Spasm of the glottis is also an important pathological element in some cases of stammering. Thirty years ago patients with impediment of speech from this cause were treated successfully by the author's father, Dr. Joseph H. Flint, the treatment consisting in forming the habit of speaking slowly, and taking an inspiration whenever an embarrassment of speech was felt, together with the daily application of the interrupted electrical current to the muscles of the larynx.

Paralysis of the Laryngeal Muscles.

The most important diagnostic symptom in cases of paralysis of laryngeal muscles, with very rare exceptions, relates to phonation. The voice is either enfeebled or lost; that is, there is incomplete or complete aphonia. Now, in laryngitis, acute, subacute, or chronic, and in cases of morbid growths, phonation is affected; the voice is either impaired or extinguished. In distinction from the dysphonia and aphonia symptomatic of laryngeal inflammation or morbid growths, the affection of the voice arising purely from paralysis, is functional. The functional character of the affection is to be determined, negatively, by excluding inflammation or lesions within the larynx, and, posteriorly, by laryngoscopic inspection.

Laryngeal inflammation and lesions involving the vocal cords may be excluded by the absence of certain characteristic traits pertaining to the voice, if it be not lost, or to the whisper, if the voice be extinguished. The affection of the voice being due to anatomical changes in the mucous membrane, there is huskiness, that is, dysphonia, if the voice be not lost, and if lost, the patient speaks in a stridulous whisper, with more or less laborious effort; whereas, if the affection be from paralysis, the voice is simply weak without huskiness, and if there be aphonia, the quality of the whisper is soft, the patient appearing to make no effort. These differential points have been already mentioned in connection with laryngitis (*vide* page 154). The laryngoscope however, affords demonstrative proof, first, of the absence of either inflammation or lesions, and, second, of the existence of paralysis. Moreover, a laryngoscopic inspection not only shows the existence of paralysis, but enables the observer to determine the particular muscles which are paralyzed. The latter is indeterminable by symptomatic evidence relating to phonation.

The paralysis may affect separately, either the adductor or the abductor muscles of the vocal cords. It may affect the muscles on both sides (bilateral paralysis), or it may be limited to the muscles on one side, (unilateral paralysis).

Bilateral paralysis of the adductor or constricting muscles of the vocal cords exists in the great majority of the cases of so-called functional or nervous aphonia. When the interior of the larynx is brought into view by the laryngoscope, and the patient undertakes to speak, the vocal cords approximate slightly or not at all; hence, the loss of voice. The respiratory movements of the glottis may be but little, if at all, affected.

Aphonia due to this variety of paralysis occurs chiefly in women, and is regarded generally as hysterical. It is not, however, always associated with other manifestations of hysteria. The voice is not infrequently suddenly lost, and as suddenly regained. The duration of the aphonia, if the voice be not restored by treatment, is very variable. In some cases it spontaneously ceases, and recurs repeatedly.

If the paralysis do not depend on cerebral disease, but is purely a functional affection, as it is in the vast majority of cases, the voice is almost invariably restored by measures of treatment. It is often restored by measures which act solely upon the mind of the patient. Cohen states that in a large number of instances in which continuous aphonia had existed for more than four years, he has succeeded in restoring the voice by the simple introduction of the laryngeal mirror, the patient having been led to suppose that this was an operation designed to effect a cure. Local stimulating applications made by means of a sponge probang, or by spray, will often succeed, doubtless, in a great measure through a moral influence. Iodine, or the nitrate of silver may be employed for this purpose. If the patient can be made to exert resolute acts of the will, this may suffice. If these measures fail, the interrupted electrical current is to be employed, one pole being brought into contact with the vocal cords, and the other over the thyroid cartilage externally. This measure is rarely unsuccessful.

After the voice has been restored, pathological conditions with which the aphonia may have been associated, afford indications for treatment. Anæmia is frequently a concomitant affection, and this claims the long-continued employment of chalybeate tonics, together with a nutritious alimentation, and measures to promote appetite, digestion, and nutrition. It is injudicious to advise complete rest of the vocal organs, even when, as is sometimes, although very rarely, the case, the aphonia was caused by overstraining of the voice. The laryngeal, as well as other muscles are strengthened by a certain amount of exercise. The practice of speaking, within the limit of fatigue, should be enjoined, as a means of keeping up the nutrition, and increasing the power of the muscles concerned in phonation.

Aphonia is sometimes imagined, and sometimes feigned. That it is not dependent on paralysis may be demonstrated by laryngoscopic inspection. When either the self-deception or the intention to deceive be determined, the patient may be entrapped into the use of the voice by partial etherization, or by giving an alcoholic to the extent of producing semi-intoxication. These measures are warrantable in order to convince the patient either that the ability to speak is not wanting, or that it is useless to continue an imposition.

Bilateral paralysis of the abductors or the dilating muscles of the vocal cords is an extremely infrequent affection. Of cases which have been reported, it has in most been caused by cerebral lesions. Enlargement of the thyroid bodies, and tumors so situated as to compress the pneumogastric or recurrent laryngeal nerve on both sides, may give rise to it. Dr. Geo. M. Lefferts has reported two cases in which it occurred in connection with syphilis.[1]

The evidence of the affection afforded by the laryngoscope, is a persistent approximation of the vocal cords, the space between them being but little, if at all, altered by respiration or efforts of phonation. Aphonia may be wanting in this variety of paralysis, but the voice is usually more or less affected. The cough is croup-like. Respiration is embarrassed, and there may be danger to life from suffocation, especially if, in connection with the paralytic affection, subacute laryngitis should happen to occur.

When this variety of paralysis depends either on centric lesions or on causes which mechanically affect the function of the nerves distributed to the abductors, treatment addressed to the paralyzed muscles will not be likely to prove useful. The important measure of treatment is tracheotomy, if the obstruction of respiration involve danger to life or great distress.

If, however, the affection do not arise from incurable lesions, centric or peripheral, a cure may be effected. In the two cases reported by Dr. Lefferts, the patients recovered under treatment with the iodide of potassium. A case in Bellevue Hospital under the author's observation ended in recovery. In neither of these was tracheotomy necessary.

In unilateral paralysis affecting either abduction or adduction, the laryngoscope shows the movements of the glottis to be limited to one side. The vocal cord which remains motionless is in the state of abduction if the paralysis prevent adduction, and it is situated near the median line if abduction be lost.

This variety of paralysis may be functional, dependent on toxæmic condition (poisoning by lead or arsenic), or occurring as a sequel of diphtheria. In general, however, it depends on either lesions affecting the brain, or pressure upon the pneumogastric or the recurrent nerve on one side. The latter is by far the more frequent cause. It is one of the symptoms of aneurism situated at the left portion of the arch of the aorta, and it is sometimes caused by aneurism of the right subclavian or carotid artery.

---

[1] *Vide* New York Medical Journal, No. for Dec. 1878. *Vide* case reported by Beverley Robinson, M.D., in Am. Journ. of Med. Sciences, April, 1878, and case reported by Dr. Andrew H. Smith, in ibid. Jan. 1878.

Aphonia is usually more or less complete. The whisper or weakened voice may be stridulous, especially if the paralysis affect abduction, and, for this reason, the affection is liable to be confounded with chronic laryngitis. This error is avoided by using the laryngoscope. Paralysis affecting abduction may give rise to dyspnœa with stridulous breathing, thus simulating laryngismus stridulus.

If the paralysis be due to aneurism or pressure from other lesions, treatment addressed to the paralyzed muscles is useless. If the suffering from dyspnœa be great, tracheotomy is indicated.

SECTION SECOND.

DISEASES OF THE CIRCULATORY SYSTEM.

PRELIMINARY OBSERVATIONS.

Division into diseases of the blood, the heart, and the vessels—Examinations of the blood—Symptomatology of disease of the heart—Pain—Disturbances of the heart's action—Abnormal characters of the pulse—Dyspnœa—Cyanosis—Œdema and Anasarca—Physical signs of diseases of the heart—Palpation—Percussion—Mensuration—Inspection—Auscultation—Abnormal modifications of the heart-sounds—Adventitious sounds or murmurs—Mitral regurgitant, mitral systolic, non-regurgitant, mitral direct, aortic direct, and aortic regurgitant murmurs—Tricuspid and pulmonic murmurs—Pericardial friction murmur—Symptoms and signs referable to vessels—Feebleness and suppression of pulsation in radial and other arteries—Arterial murmur—Venous pulse—Venous hum—Venous congestion.

A NATURAL division of the diseases of the circulatory system is into those of the blood, the heart, and the vessels.

The diseases of the blood, regarded from a nosological stand-point, are not to be confounded with the various morbid conditions embraced in its pathology. Morbid conditions of the blood are involved in a large proportion of local as well as general diseases. Some of these conditions are demonstrable, such as the accumulation of urea (uræmia) in diseases of the kidneys, of bile pigment (cholæmia) in simple jaundice, of cholesterine (cholesteræmia) in grave forms of that disease, increase of fibrin (hyperinosis) in acute inflammations, retention of carbonic acid and deficiency of oxygen in diseases which occasion apnœa, an excess of uric acid (uricæmia) in gout, and an abnormal amount of sugar (glycohæmia) in diabetes mellitus. The diseases due to alcoholism imply the introduction of alcohol into the blood, saturnine diseases the introduction of lead, narcotism the introduction of opium or other narcotics, etc. It is logically certain that the so-called infectious diseases, contagious and non-contagious, arise from morbific matter in the blood derived from without the body, although the presence of this matter may not be demonstrable. These varied morbid conditions are not reckoned as blood diseases, but they constitute essential pathological elements of diseases which are embraced in other nosological divisions. There are, however, certain affections of the blood, the local effects or manifestations of which are not connected with any one of the different anatomical systems of the body, and which it is most convenient to classify under the name blood diseases. They are as follows:—

A group of affections in which diminution of the number of red corpuscles (anæmia) is a prominent feature, namely, simple anæmia, chlorosis, pernicious anæmia, Addison's disease, and lymphatic anæmia or Hodgkin's disease; an affection characterized by increase of the number of white corpuscles (leucocythæmia) and general dropsy as dependent especially on diminution of albumen in the blood serum. To these affections are to be added pyæmia and septicæmia, scorbutus, purpura, and hæmophilia.

These will be considered in this section as individual or substantive blood diseases.

Examination of the Blood.

Examinations, chemical and microscopical, of the blood shed much light on its pathological conditions, but in a clinical point of view, that is, with reference especially to diagnosis, their availability and usefulness, in the present state of our knowledge, are very limited.

The method, introduced by Malassez, of determining with exactness the number of red and white corpuscles in a cubic millimetre of blood, and the improved instrument (hématimètre) devised by Hayem and Nachet for this purpose, constitute a highly important addition to the means of investigating physiological and pathological conditions relating to these blood-constituents. Prof. Keyes has rendered valuable service by the employment of the hématimètre in demonstrating that an effect of small doses of mercury is an increase of the red corpuscles, especially in cases of syphilis. The author, however, has the authority of Prof. Keyes for the statement that the difficulties and the liabilities to error in the employment of this instrument preclude its availability as a ready means of diagnosis.[1]

The microscopical examination of a drop of blood may enable the observer to roughly estimate diminution of the red corpuscles without any attempt to enumerate them. The blood may appear to the naked eye comparatively pale, and it may give a paler stain to linen than when the red corpuscles are abundant. But the appearance of the conjunctiva, of other mucous membranes, and of the prolabia, together with the auscultatory sign, the venous hum, and the symptomatic phenomena, are to be relied upon for the diagnosis. A morbid increase in the number of white corpuscles may be determined by microscopical examination sufficiently for diagnosis, without ascertaining the exact number in a given quantity of blood.

Diminution of albumen, or, what is nearly equivalent in a pathological point of view, an increased relative proportion of water (hydræmia), may be determined by ascertaining the density of the blood. This, however, is rarely resorted to as a means of diagnosticating dropsy dependent thereon, inasmuch as the pathological connections and symptoms in cases of dropsy suffice for the diagnosis.

In pyæmia and septicæmia, purpura, scorbutus, and hæmophilia, examinations of the blood, either chemical or microscopical, do not afford diagnostic criteria which are available in medical practice.

---

[1] For an account of this instrument *vide* article by Prof. Keyes in the American Journal of the Medical Sciences, January, 1876.

SYMPTOMATOLOGY OF CARDIAC DISEASE.

Embracing under the term symptomatology symptoms, exclusive of physical signs, those which have special diagnostic relations to diseases of the heart are pain, disturbances of the heart's action, abnormal characters of the pulse, dyspnœa, cyanosis, œdema, and anasarca.

Pain.

Acute lancinating pain referred to the præcordia is usually more or less prominent as a symptom in cases of acute pericarditis. Intense præcordial pain, which has been called a heart-pang, characterizes angina pectoris, a neuralgia generally associated with cardiac lesions. Irrespective of these affections, pain rarely enters into the clinical history of diseases of the heart. The pain in the left side of the chest from which anæmic women often suffer, is apt to lead patients to fear the existence of cardiac disease. This pain, if pulmonary affections be excluded, is due to either pleurodynia or intercostal neuralgia, generally the latter.

Disturbances of the Heart's Action.

The heart's action is increased in frequency in cases of endocardial and pericardial inflammation, partly in consequence of the proximity to the muscular structure of the inflamed membranes, and, in part, as the result of symptomatic fever. As it is difficult to determine the relative influence of these two causes, and as increased frequency of the heart's action is common to many affections, this symptom has little or no diagnostic significance in cases of endo- and pericarditis.

Valvular lesions of the heart may exist for a long period without disturbance of the heart's action, either in frequency or rhythm. These lesions cannot be excluded by the fact that the action of the heart is perfectly regular. As a rule, notable disturbance does not ensue until valvular lesions have led to considerable enlargement of the heart.

Enlargement of the heart by hypertrophy involves increased power of the heart's action, but not necessarily increased frequency nor any disturbance of rhythm. The increased power of action is determined by physical signs, and is often apparent to an observer in movements of dress, bedclothes, and even the trunk. The patient is often unconscious of it, in consequence of its having taken place slowly and imperceptibly. Enlargement by dilatation is apt to occasion irregularity of the heart's action, with or without increased frequency. These disturbances in many cases are not noticed by the patient. In this respect cases of organic disease present a striking contrast to cases in which irregularity in the heart's action is purely functional. In the latter cases patients are vividly conscious of the irregularity of action, and generally they are apprehensive of sudden death. The different varieties of irregular action of the heart will be noted in connection with the diagnosis of functional disorder. As a general statement, irregularity of action is not to be regarded as sufficient proof of organic disease.

Abnormal Characters of the Pulse.

Increased frequency of the pulse, its weakness on the one hand, or, on the other hand, increase of its strength and its irregularity, represent, of course, corresponding disturbances of the heart's action. There are, however, certain characters of the pulse, which have important signification when taken in connection with the evidence of cardiac lesions afforded by physical signs. A weak or small pulse when the heart's impulse is strong, if the signs show mitral regurgitation, is evidence that the quantity of blood which regurgitates is large; if the signs show mitral stenosis, the contraction of the mitral orifice is considerable, and if there be aortic obstructive lesions, the free passage of blood from the ventricle into the aorta is much impeded. Free aortic regurgitation gives to the pulse a jerking character which is diagnostic; and in addition, arteries situated near the surface show locomotive movements which are significant of regurgitant lesions at the aortic orifice. A lack of correspondence between the number of arterial pulsations and of the impulses of the heart, or of the heart-sounds, is evidence that some of the systoles of the left ventricle have not force enough to cause an appreciable pulse; in other words, some of the ventricular contractions from their weakness are not represented by a radial pulse. If this lack of correspondence be not recognized, an enumeration of the pulse leads to an erroneous conclusion as regards the frequency of the heart's action. This abnormity of the pulse is incident to dilatation of the heart, and is one of the varieties of functional disorder.

Dyspnœa.

Dyspnœa, a sense of the want of breath, is the most marked subjective symptom in cases of certain valvular lesions with dilatation of the heart. Existing in a degree to render difficult or impossible maintenance of the recumbent posture, it is called orthopnœa. It is the source of the greatest suffering, with the exception perhaps of angina pectoris, connected with organic disease of the heart.

Cardiac dyspnœa represents especially over-distension and dilatation of the left auricle. The obstruction of the pulmonary circulation dependent thereon is an obstacle to hæmatosis. Dilatation of the right ventricle, by impairing the force of this portion of the heart, increases the pulmonary congestion and consequent suffering from the sense of the want of breath. Diminished force of the right ventricle due to dilatation not resulting from mitral lesions, and to fatty degeneration, occasions dyspnœa especially on exertion.

Cyanosis.

Cyanosis, that is, blueness or lividity of the prolabia, face, and mucous membrane of the mouth, is a symptom which is chiefly due to dilatation and over-distension of the right auricle. It occurs when the right side of the heart becomes dilated as a consequence of mitral obstructive or regurgitant lesions. It also occurs when dilatation takes place irrespective of valvular lesions, as in cases of pulmonary emphysema. The symptom is in a measure due to deficient oxygenation of the blood as the direct consequence of obstruction at the left auricle. In so far as it results from obstruction at the right auricle, it represents congestion of the systemic venous radicles.

Cyanosis is usually associated with more or less dyspnœa. The latter symptom is, however, not always in proportion to the former; notable cyanosis may coexist with but little dyspnœa, especially when the body is at rest, and *vice versâ.*

Œdema and Anasarca.

Œdema of the lower limbs and face, and generalized œdema or anasarca, belong to the clinical history of organic diseases of the heart when they have reached a certain degree of development. These symptoms, like cyanosis, are in special relation to dilatation and distension of the right ventricle and auricle. The immediate cause of the dropsical effusion is persistent congestion of the systemic veins. They are the remote consequences of mitral rather than aortic valvular lesions, inasmuch as the former more constantly and earlier lead to dilatation of the right side of the heart. They are consequences of dilatation of this side when it occurs, irrespective of valvular lesions, from the obstruction to the pulmonary circulation incident to emphysema and some other affections of the lungs.

Anasarca or general dropsy, whenever it is not an effect of diminished albumen, or hydræmia, is symptomatic of cardiac disease in the great majority of cases. It is then distinguished as cardiac dropsy. Dropsy, as one of the blood diseases, will be considered in its different pathological connections.

PHYSICAL SIGNS OF CARDIAC DISEASE.

Physical signs of cardiac disease are furnished by palpation, percussion, mensuration, inspection, and auscultation.

Palpation.

By palpation are determined the situation of the apex-beat of the heart, its strength or weakness, the area within which it is felt, other cardiac impulses than the apex-beat, a heaving movement of the præcordia and purring thrill or fremitus. These are signs involved in the diagnosis of enlargement of the heart, and of the kind of enlargement, that is, whether hypertrophy or dilatation predominate.

Percussion.

By percussion the area of cardiac dulness, or, in other words, the boundaries of the heart, are determined; also, the superficial cardiac space, that is, the space within the præcordia in which the heart, not covered by lung, is in contact with the thoracic parietes. The fact of enlargement, or otherwise, and its degree, are thus ascertained by this method of physical examination.

Mensuration.

The dimensions of the thoracic space which corresponds to the size of the heart may be measured by graduated tape or the callipers; also, the distance of the boundaries of this space from the median line and the linea mammalis, that is, a vertical line passing through the nipple, and the distance of the apex-beat from the two lines just named. Practically these measurements are not of much importance. Enlargement of the præcordial region may be accurately ascertained by means of callipers. Inspection with reference to this point, however, answers all practical purposes.

Inspection.

An abnormal prominence of the præcordial region is ascertained by inspection; also, diminished or abolished intercostal depressions within the præcordia, in cases of pericardial effusion.

Auscultation.

The auscultatory signs of cardiac diseases relate to abnormal modifications of the heart-sounds, and to adventitious sounds or murmurs. The latter may be produced within the heart, and they are then called endocardial, or they may be caused by the rubbing together of the pericardial surfaces, the latter being called exocardial, pericardial, or, more commonly cardiac friction murmurs.

The different varieties of the abnormal modifications of heart-sounds, and the diagnostic import of each variety are as follows:—

The first sound over the apex is intensified, prolonged, and its booming quality marked when the power of the heart's action is increased by hypertrophy of the muscular walls. Per contra, the first sound over the apex is weak, shortened, and valvular in quality, when the power of the heart's action is diminished by dilatation or by fatty degeneration. In some cases of the latter lesion the first sound is inaudible over the apex, the second sound being alone heard, and if the muscular power be greatly diminished both sounds may be wanting.

The second sound over the aorta, that is, in the second intercostal space on the right side close to the sternum, is intensified by hypertrophy of the left ventricle, the increase of intensity being estimated by comparison with the second sound over the pulmonary artery, that is, in the second intercostal space on the left side close to the sternum. The aortic second sound is weakened, or it may be suppressed, by lesions which either impair or prevent the action of the aortic valves. Weakening of the aortic second sound is also an effect of mitral obstructive or regurgitant lesions, owing to the lessened quantity of blood propelled into the aorta with each ventricular systole. The second sound over the pulmonary artery is intensified by hypertrophy of the right ventricle caused by mitral lesions, and by emphysema or other pulmonary affections which obstruct the circulation through the lungs, the increase of the intensity of this sound being estimated by comparison with the aortic second sound.

Adventitious sounds or murmurs produced within the heart (endocardial murmurs), constitute the evidence of lesions affecting the valves or orifices. They differ in quality, and, according to qualitative differences, are of three kinds, namely, soft, rough, and musical. The soft murmurs, which are by far the most frequent, are known as bellows' murmurs. They may be produced at either of the four orifices, namely, the mitral, aortic, tricuspid and pulmonic; but inasmuch as the so-called valvular lesions, are seated in the left side of the heart in the great majority of cases, the practitioner has to deal chiefly with the mitral and aortic murmurs.

The murmurs representing lesions in the left side of the heart, named according to the blood-currents by which they are produced, are as follows: The mitral direct, and the mitral regurgitant murmur; the aortic direct, and the aortic regurgitant murmur. The corresponding murmurs on the right side of the heart, are the tricuspid direct, the tricuspid regurgitant, the pulmonic direct, and the pulmonic regurgitant. A murmur may be produced within the left ventricle, with the ventricular contraction or systole, without lesions permitting mitral regurgitation. This may be distinguished as a mitral systolic non-regurgitant or an intra-ventricular murmur.

The distinctive characters and diagnostic significance of murmurs in the left side of the heart, respectively, are as follows: 1. Mitral regurgitant murmur. This is heard with the first sound of the heart, that is, the murmur begins with this sound. It may be limited to a small area around the apex beat; if not thus limited, its maximum of intensity is in that situation. If loud enough to be more or less diffused, the direction in which it is best and farthest transmitted, is laterally over the left side on a level with the apex. It is often heard on the posterior aspect of the chest, near the lower angle of the scapula. Under these circumstances it denotes incompetency of the mitral valve, and a consequent mitral regurgitant current.

2. Mitral systolic non-regurgitant, or intra-ventricular murmur. This is heard with its maximum of intensity at the situation of the apex-beat, and over the body of the heart. It is not transmitted far, if at all, to the left of the heart. This murmur occurs in endocarditis. It may be caused by a tendinous cord stretching across the ventricle as an anatomical anomaly.[1]

It may be produced by the pressure of the apex of the heart against adjacent pulmonary structure, the murmur then being caused by the expulsion of air from the air vesicles of the lungs. It may be due to atheroma within the ventricle, the function of the valves being unaffected. It is not therefore in all cases a murmur of importance in its pathological or diagnostic significance. The author has found this murmur twenty to thirty years ago and subsequently, in persons who at the present time are free from any symptoms of cardiac disease.

3. Mitral direct, or pre-systolic murmur. This murmur precedes the first sound of the heart, abruptly ceasing, as it were cut short by the first sound. It is heard within a limited area around the apex-beat. It

---

[1] This explanation of the murmur in some cases has been demonstrated by Prof. Janeway.

is almost invariably rough, having a vibratory or blubbering quality. It denotes stenosis of the mitral orifice, generally caused by adherence together of the curtains constituting the mitral valves, with this exception: It may exist in cases of free aortic regurgitation without any mitral lesions.[1]

4. Aortic direct murmur. This murmur may be due to an abnormal condition of the blood. If caused by aortic lesions, they may either obstruct the passage of blood in the aortic direct current, or they may simply occasion roughness of the surface over which this current flows. Dilatation of the aorta just above the orifice may occasion it. It may, therefore, denote lesions which are innocuous as well as those which are important. The characters which distinguish the murmur are its occurrence with the first sound (systolic), its maximum of intensity being at the base of the heart, oftener on the right than on the left side of the sternum, and its transmission upward by the current of blood so that it may be heard over the carotid arteries.

5. Aortic regurgitant murmur. This murmur is heard with the second sound of the heart, that is, beginning with that sound. It is generally heard over the aorta in the second intercostal space on the right side close to the sternum. It is transmitted downward, and is, in most instances, loudest close to the sternum on the left side at the junction of the fourth costal cartilage. It denotes insufficiency of the valves of the aorta and a consequent aortic regurgitant current.

Of the foregoing four murmurs, two or three may exist in combination, or all four may be present. Each is then to be recognized by its distinctive characters. The only difficulty in this recognition is when the aortic direct and the mitral regurgitant murmur are combined, these two murmurs being systolic, that is, accompanying the first sound of the heart. Each is to be distinguished by its distinctive characters, aside from its connection with the first sound.[2]

Of the corresponding murmurs representing lesions on the right side of the heart, namely, the tricuspid direct, the tricuspid regurgitant, the pulmonic direct, and the pulmonic regurgitant, the tricuspid direct and the pulmonic regurgitant are exceedingly rare. The lesions giving rise to the pulmonic direct murmur are generally congenital; hence, in most of the instances in which it is met with, the patients are young. This murmur, like the aortic direct murmur, does not always denote lesions; it not infrequently represents blood-changes incident to anæmia. The tricuspid regurgitant murmur occurs oftener than the other murmurs produced in the right side of the heart. It is generally associated with murmurs produced in the left side of the heart, and especially with the mitral murmurs.

A pericardial friction murmur is distinguished from endocardial murmurs by the following descriptive characters: It is generally produced by both the systolic and diastolic movements of the heart, and is therefore a double murmur, or a to-and-fro sound. The two murmurs have not exactly the same rhythm as the heart sounds; in other sounds, the systolic and the diastolic murmur are not in exact unison with the first and second sound of the heart. The murmurs fluctuate in intensity, as well as in their rhythmical relations with successive beats or revolutions of the heart. The character of the murmurs is suggestive of rubbing or friction. They seem to be near the surface, or superficial. They are intensified by pressure of the ear or stethoscope upon the chest. They are heard only within the præcordial area, that is, they are not transmitted beyond the boundaries of the heart, as are often certain of the endocardial murmurs. It may aid in the recognition of the friction murmur to bear in mind that the only two endocardial murmurs combined, for which they are likely to be mistaken, are the aortic direct and the aortic regurgitant murmur.

---

[1] For an explanation of this fact, which, as the author supposes, he was the first to point out, *vide* Treatise on Diseases of the Heart, second edition, 1870, page 207; also Manual of Percussion and Auscultation, 1876, page 386.

[2] For a fuller account of all the murmurs, etc., *vide* Manual of Percussion and Auscultation, by the author, 1876.

A pericardial friction murmur is very constantly present in cases of pericarditis, and a positive diagnosis in the first stage of this disease must depend on the presence of this sign.

In some cases of pleurisy or pleuro-pneumonia the movements of the heart occasion a rubbing together of pleural surfaces roughened with lymph, so as to give rise to a friction murmur identical in character with that produced within the pericardial sac. This is known as a cardiac pleural friction murmur.

SYMPTOMS AND SIGNS REFERABLE TO VESSELS.

Relative feebleness and suppression of the radial pulse on one side are symptoms in some cases of aortic aneurism. Pulsation of the radial artery, and of other arteries, may be weakened or lost, not only as effects of aneurisms, but from thrombosis, embolism, and the pressure of a tumor somewhere between the point of observation and the heart. The author has met with a case in which the radial and brachial pulse on both sides were wanting, the carotid pulse on the right side absent, and on the left side just appreciable, the femoral arteries pulsating strongly. The patient was well nourished, but had frequent attacks of vertigo and temporary blindness, together with a tendency to syncope on any exertion. The mental faculties were not affected. Death took place from pneumonia. The autopsy showed complete plugging of the innominate artery, and of the left subclavian, the left carotid being obstructed by a fibrinous plug so as to admit of the passage only of a small probe.

Bellows murmur over an aneurismal tumor is of frequent, but by no means of constant, occurrence. Aneurismal murmurs are either single or double, that is, accompanying the first sound of the heart (systolic) if single, and both sounds if double, the diastolic murmur being caused by the recoil of the coats of the aneurism after dilatation from the influx of blood with the ventricular systole.

Pressure upon an artery may occasion a systolic murmur, and over a tumor pressing on the abdominal aorta, a double murmur may be heard. The latter is, therefore, not proof that a tumor is aneurismal.

A systolic murmur over the aorta and pulmonic artery in the second intercostal space on the right and left side close to the sternum, is often a sign of impoverished blood or anæmia. This blood disease causes murmurs in other arteries, namely, the carotid, subclavian, and femoral. A systolic murmur in the left subclavian artery is heard in some healthy persons; in these instances, it is a normal peculiarity. A systolic murmur in the left infra-clavicular region is, therefore, not evidence of disease, if unattended by other morbid signs, and the presence of this murmur is not a sufficient reason for refusing an application for life insurance. An arterial hæmic murmur is generally soft, but is sometimes rough; hence roughness of the murmur is not proof of its being organic, that is, dependent on a lesion of either the heart or arteries.

A communication between an artery and a vein (aneurismal varix) occasions a murmur, and often a thrill communicated to the touch.

A venous pulse is the pulsation apparent to the eye, and sometimes, but very rarely, perceived by the touch. It is seldom observed elsewhere than in the superficial veins of the neck, and oftener on the right than on the left side. It is caused by a retrograde blood-current produced by the contraction of either the right auricle or the right ventricle. Hypertrophy of the right auricle and dilatation of the right ventricle are the conditions favorable for its occurrence when it is auricular. When the pulse is produced by the right ventricle, the conditions are hypertrophy of the right ventricle and tricuspid insufficiency. These conditions may be such that both an auricular and a ventricular venous pulse are present.

In determining that the pulse is venous, pulsation of an artery beneath the vein is to be excluded. This point is quickly determined. A venous pulse is suspended by slight pressure over the neck just above the clavicle, the pressure suspending the venous circulation, but without any effect on the arteries. The pulse ceases if it be venous, and continues if it be arterial. It is easy to determine whether the venous pulse be auricular or ventricular, or both. If auricular, the venous pulse takes place just before the carotid pulse. It is syncronous, or nearly so, with the latter, if the venous pulse be ventricular. There are two pulses of the vein for one carotid pulse, if an auricular and venous pulse be both present.

Auscultation furnishes an important physical sign referable to the cervical veins, namely, the venous hum (*bruit de diable*). This is a continuous humming murmur, heard when the stethoscope is placed upon the neck posterior to the sterno-cleido-mastoid muscle, especially on the right side of the neck, the patient's head being rotated as much as possible to the left. That this murmur is produced by the current of blood in the veins, is demonstrated by placing the finger above the point at which the stethoscope is applied, and making moderate pressure; the murmur is instantly arrested, and it returns directly the finger is removed.

This murmur requires for its production an abnormal condition of the blood. It is a very constant sign in anæmia, and is important in the diagnosis of that blood disease. The disappearance of the murmur is proof that the anæmic condition of the blood no longer exists.

Congestion of the entire venous system is shown by fulness of the superficial veins and lividity over the whole body, but especially marked on the prolabia and face. This is cyanosis denoting obstruction at the right side of the heart. Congestion, however, may be limited to a portion of the venous system. A cyanotic appearance confined to the head and upper extremities is a sign of obstruction of the superior vena cava, and should suggest the probability of aneurism of the aorta, especially in a male patient over forty years of age. A congestion limited to one side of the head and one upper extremity, points to an obstruction of the innominate vein on one side. Thrombosis of a vein may be an obstructing morbid condition. An instance of not infrequent occurrence is thrombosis of the iliac or the femoral vein, giving rise to congestion of one lower extremity and consequent œdema. This is the pathology of the affection heretofore known as phlegmasia dolens. Obstruction of the portal vessels in cirrhosis of the liver, sometimes leads to notable enlargement of the superficial veins of the abdomen from the diversion of a portion of the portal blood through anastomosing branches into the systemic veins.

THE DIAGNOSIS AND TREATMENT OF DISEASES OF THE CIRCULATORY SYSTEM.

I.

DISEASES OF THE BLOOD.

SIMPLE ANÆMIA, CHLOROSIS, PERNICIOUS ANÆMIA, ADDISON'S DISEASE, HODGKIN'S DISEASE, LEUCOCYTHEMIA, GENERAL DROPSY, PYÆMIA AND SEPTICÆMIA, SCORBUTUS, PURPUPA HÆMORRHAGICA, HÆMATOPHILIA.

SIMPLE ANÆMIA.

THE term simple is here used to distinguish the affection from the pernicious variety of anæmia, and from other affections of the group of which anæmia is a characteristic. These affections are to be excluded in making the diagnosis of simple anæmia. The anæmic condition is incidental to various diseases, such as phthisis, chronic pleurisy, Bright's disease, cirrhosis of the liver, carcinoma in different situations, etc. In these diseases the anæmia is symptomatic, and they are to be excluded. Anæmia is simple and a substantive affection when the morbid condition of the blood is not merely an element in the pathology of either a local or a general disease, and when it is not connected with grave lesions which are either discoverable or occult.

The anæmic condition is often apparent at a glance. The face and prolabia are notably pallid, and the eyes are cerulean. This, however, is not true of all cases. Anæmia does not always cause a marked change in the complexion, and it may exist with a rosy hue of the face. Not infrequently the anæmic appearance disappears when the action of the heart is increased, especially by emotional excitement. In these cases the diagnosis must be based on other than facial evidence. This evidence is derived from symptoms denoting the pathological effects of anæmia, and from physical signs.

Diagnostic symptoms of anæmia relate to the nervous system. Cephalalgia, intercostal neuralgia, and neuralgic affections in other situations are common, and warrant a suspicion of anæmia if not referable to other causes. The pain in the left side so common in women is generally connected with anæmia. Almost invariably in anæmic women there is hyperæsthesia over points of the chest situated in the intercostal spaces near the sternum, in the axillary or infra-axillary region and by the side of the dorsal vertebræ, although intercostal neuralgia be not present. Fatigue after slight exertions, either mental or physical, and want of endurance are constant symptoms. Mental depression is rarely wanting, and the depression is apt to take the form of anxiety respecting health, or an apprehension of serious disease. Coldness of the extremities, as a subjective and objective symptom, is common. Rapid action of the heart is easily induced, and patients often suffer from palpitation. The respirations are unduly increased in frequency by muscular exercise. A combination of more or less of these symptoms renders the diagnosis more than probable, provided other affections of which anæmia is a pathological element be excluded.

Corroborative diagnostic evidence is obtained by ascertaining the existence of well-known causes of simple anæmia, namely, menorrhagia or hemorrhage in any situation, pregnancy, lactation, exposure to malaria, lead poisoning, and insufficient alimentation. Most of these causes pertain to women rather than to men, and, hence, simple anæmia occurs much oftener in the former than in the latter.

Conclusive diagnostic evidence is afforded by auscultation. With the stethoscope applied to the neck, as already stated (*vide* p. 176), the venous hum is found, together with often a systolic bellows murmur in the carotid artery. The latter murmur is also often heard over the subclavain arteries, and, at the base of the heart, over the aorta and the pulmonic artery.

The first object in the treatment of the cases of simple anæmia is the removal of the cause or causes. Pregnancy can be avoided, the secretion of milk can be arrested, menorrhagia or other hemorrhagic losses may perhaps be prevented, the patient may be able to escape a continued malarial influence, exposure to lead need not continue, and deficiencies in diet can generally be supplied.

The special remedy is iron. Of the varied chalybeate preparations, a choice is to be made with reference to toleration. It is useful to change the preparation from time to time, partly for a moral effect, and in part because the medicinal efficacy seems to be thereby increased. The practitioner often meets with a conviction on the part of the patient that iron produces unpleasant effects. It is safe to assume that in most instances this is an error. It is, however, important that a remedy be not prescribed which the patient believes will not be well tolerated. The author's method of meeting this difficulty is to assure the patient that there is a preparation which never occasions inconvenience, and, after this assurance, he is in the habit of prescribing pure iron reduced by hydrogen. If there be no prejudice against chalybeates, the muriated tincture with dilute phosphoric acid, the citrate, the pyrophosphate, and the tartrate are eligible forms. The dialyzed iron recently introduced seems to be a valuable addition to the list of chalybeates.

The preparations of iron should be continued steadily for a considerable or long period. It is good policy to state this in advance to patients; and in order to reconcile them to their use for months or even years, it is well to say that iron in cases of anæmia is a food rather than a drug. As a rule it is better that chalybeates be taken after than before meals.

Hygienic measures form an important part of the treatment. A nutritious and abundant diet, following the instincts of the patient, rather than any abstract rules, in respect of the articles of food, is essential. Wine or malt liquors are often useful. Of wines, Burgundy is in general to be preferred, but the taste and experience of the patient are to govern the selection. Of malt liquors, porter or the weaker varieties are to be recommended according to the effect as determined by trial, and by the patient's choice. Life in the open air and a certain amount of muscular exercise promote appetite, digestion, and nutrition. Change of scene and recreation often have a potential influence on assimilation. Under the head of hygienic treatment is to be included encouragement by positive assurance of the absence of serious disease and the certainty of recovery.

CHLOROSIS.

Chlorosis, a term which derives its significance from an occasional greenish tint of the complexion, is the name of an affection of which anæmia is an essential element, standing in a causative relation to the greater part of its symptomatic phenomena. It belongs among the diseases peculiar to women, and occurs chiefly at or near the time of puberty. It is in some way connected with the evolution of the sexual system.

The affection presents the group of symptoms and the signs which are present in cases of simple anæmia, and which need not be here repeated. The diagnosis is to be based on these symptoms and signs, the various diseases into which anæmia enters as a symptomatic condition being excluded. Very generally menstruation is disordered, but not in a uniform manner; this function is often diminished or suppressed, and, on the other hand, menorrhagia is not uncommon. A depraved appetite, the patient craving clay, slate, and other indigestible articles, characterizes some cases.

The mental management is of prime importance. The mind should, as far as practicable, be occupied with intellectual pursuits, and innocent recreations. Associations, amusements, and reading should be regulated with a view to the development of the higher sentiments. Proper caution should be exercised in admitting the probability of uterine disease, and the employment of vaginal examinations. The habits of life should tend to the invigoration of body and mind. Travelling and change of scene are often useful. In other regards, the treatment is the same as in cases of simple anæmia.

PERNICIOUS ANÆMIA.

The affection called by some recent writers pernicious anæmia is essentially that described by Thomas Addison in 1855, under the name "idiopathic fatal anæmia."[1] The chief, constant, determinable pathological condition is the anæmia. This is doubtless a secondary pathological condition, but the primary or antecedent morbid changes of which it is an effect, are not established. The distinctive characters belonging to the clinical history are sufficient for its recognition as an individual affection. The term pernicious expresses the fact that the affection differs essentially from simple anæmia and chlorosis. It ends fatally in the great majority of cases. It is characterized by slowly progressive impairment of muscular power and of all the vital functions, death taking place by asthenia within a period varying from three months to a year. It has certain features in common with a blood disease to be presently considered, namely, leucocythemia. The distinctive characteristic of the latter affection, however, as expressed by the name, is wanting in pernicious anæmia. The latter has been called pseudo-leucocythemia.[1]

---

[1] The name "Progressive Pernicious Anæmia" was introduced by Biermer, of Zurich, in 1872. Prof. William Pepper suggests Anæmatosis.

The following sketch embraces the more important of the symptoms in cases of pernicious anæmia: the facies shows intense anæmia, being in some instances as devoid of color as a cadaver; it is sometimes jaundiced, and sometimes has a sallow or straw-colored hue. Œdema of the face occurs frequently, and in the latter period of the disease there may be considerable general dropsy. As the disease progresses the prostration becomes extreme; syncope is liable to occur on exertion, and the patients sometimes suffer from a distressing sense of impending death. The pulse is more or less accelerated; it is rendered frequent by any exertion or mental excitement, and it is notably compressible. The impulse and sounds of the heart also show great weakness of this organ, which is explained by the fact that fatty degeneration of its muscular structure is generally found after death. The anæmic murmurs are marked. Hemorrhages are liable to occur from the nose, mouth, and kidneys; petechiæ are sometimes observed, and the opthalmoscope may show ecchymosis in the retinæ, although vision is unaffected. The intellectual faculties are usually intact up to a late period, when there may be passive delirium. Coma takes place in some cases before death, attributable, perhaps, to cerebral hemorrhage. The patient suffers more or less from dyspnœa and palpitation. The appetite is lost, and the anorexia often amounts to a loathing of food. Notwithstanding the fact just stated, the bulk of the body is not greatly diminished; the affection does not lead to great emaciation. During the progress of the affection fever occurs in irregular paroxysms, the temperature rising from 101° to 103° or 104°. Women are more liable to the affection than men. The liability to it is greater in middle age but it is not limited to any period of life. In a certain proportion of cases it is developed during pregnancy. In making the diagnosis, simple anæmia and chlorosis are excluded by the progressive character of the affection and the gravity of the symptoms. Renal disease is to be excluded by the negative results of examinations of the urine. A trace of albumen, however, is sometimes found, but without tube casts or other evidence of disease of the kidneys. Phthisis, carcinoma, etc., are eliminated by a proper interrogation of all the important organs of the body. The history and symptoms are inconsistent with malaria, lead poisoning, and other known toxæmic conditions. An examination of the blood shows notable diminution in number, and variations in size, of the red corpuscles, but an inconsiderable, if any, increase of leucocytes; hence leucocythemia is excluded. Counted by means of the *hématomètre* the red corpuscles have been found diminished to a fourth, a sixth, and even a tenth of their normal number.

---

[1] The author reported several cases in 1871, which might be considered as cases of pernicious anæmia. They were reported as probably exemplifying degeneration of the gastric tubules. *Vide* New York Med. Journal, No. for March, 1871.

There is little, if any, ground for the hope of material benefit from treatment. Of the cases reported, a fatal result has been the rule with so few exceptions as to render it perhaps probable that there was an error of diagnosis in the cases considered as ending in recovery. The measures rationally indicated are those which have reference to the anæmia. As a means of prolonging life, alimentation is of essential importance, and nutritive enemata should be resorted to if the anorexia preclude the ingestion of food by the stomach. The transfusion of blood has been tried, but without any success.[1]

The presence of the intestinal parasite called Anchylostomum duodenale, in great numbers, gives rise to a succession of symptoms closely corresponding to those belonging to the clinical history of pernicious anæmia. So far as our present knowledge goes, this parasitical affection prevails exclusively in tropical climates. It remains to be ascertained whether it may not exist in certain of the cases of pernicious anæmia in all climates (*vide*, intestinal parasites, in the section devoted to diseases of the digestive system).

ADDISON'S DISEASE.

This rare affection is named after the observer who was the first to point out its distinctive characters and its connection with disease of the supra-renal capsules. It is also called *bronzed skin disease* and *supra-renal melasma.* It seems proper to include it in the group of the blood diseases under present consideration, inasmuch as anæmia is a prominent characteristic, and considering that its essential pathology is unknown. Disease of the supra-renal capsules, assuming its existence in all cases (an assumption which is not warrantable), is to be regarded in the light of a concomitant event, and not as constituting the affection.

The diagnostic criterion is the dark discoloration of the skin. The color varies within narrow limits. It is either dark or light brown, and sometimes has an olive green tint. The appearance is that of a mulatto, and it is caused by the same pigmentary condition which exists in the skin of the negro. The coloration generally extends over the whole cutaneous surface, but is greater in certain situations, namely, the face, neck, hands, genitals, groins, axillæ, the umbilical region, and in women around the nipples. Exceptionally it is confined to patches, the color of the intervening spaces being normal. In determining that the appearance is diagnostic of Addison's disease, other discolorations bearing some analogy to the melasma of this affection are to be excluded. These are the dark color sometimes accompanying pityriasis (*pityriasis niger*), the yellowish-brown color of chloasma, the blackish aspect in some cases of protracted jaundice (*icterus niger*), the effect of the sun's rays on parts not protected by clothing (*ephelis*), and the change in color produced by the long-continued use of the nitrate of silver as a remedy. Greenhow has reported a case in which a bronzed coloration, not unlike that in Addison's disease, was attributable to "dirty habits, long continued exposure, and the irritation of vermin." Similar cases have been described by Voght under the name "Vagabonden Krankheit," and Greenhow proposes to adopt the name "vagabond's disease."[1] The differential points pertaining to these various discolorations, together with the circumstances therewith connected, render their exclusion in general sufficiently easy.

---

[1] For a fuller consideration of this affection, the reader is referred to article by Biermer in Correspondenzblatt für Schweizerische Aerzte, Jahrgang 2, 1872, No. 1; Uber perniciöse anämie von H. Quincke, Sammlung Klinisher Vorträge, herausgegeben, von Richard Volkmann, No. 100, 1876, and an article by William Pepper, M.D., in the Am. Jour. of Med. Sciences, No. for October, 1875.

The symptoms preceding and accompanying the bronzed color of the skin, and the elimination of other affections which would account for these symptoms, make the diagnosis positive. Prior to the melasma, in most cases, the patient has suffered for a greater or less period from general debility which has progressively increased, and which is not explained by any discoverable disease.

The occurrence of vomiting, when the stomach is empty, especially in the morning or after some muscular exertion, without much nausea, and pains referable to the lumbar region and the epigastrium, often precede the coloration of the skin. These symptoms are usually present and are more marked after the coloration is observed. Vomiting especially, in a large proportion of cases, becomes a prominent symptom during the progress of the affection. The action of the heart is feeble, as shown by the characters of the pulse and the cardiac sounds, either with or without increased frequency. The anæmic murmurs are heard in the neck and at the base of the heart. Vertigo and a tendency to syncope are induced by slight exertions, if the debility be extreme. Cephalalgia is an occasional symptom. Delirium and coma may occur toward the close of life. As in cases of pernicious anæmia, the bulk of the body is not diminished in proportion to the general debility during the progress of the affection.

If the affection be primary and uncomplicated, an interrogation of all the important organs of the body furnishes no evidence of disease sufficient to account for the symptoms. The affection, however, in a certain proportion of cases, is developed consecutively to phthisis; more rarely to cancer and scrofulous disease of the lymphatic glands. In these instances, in addition to the diagnostic import of the melasma, the symptoms are out of proportion to the local disease. An examination of the blood shows that the leucocytes, if increased at all in number, are not sufficiently so to constitute leucocythemia.

Addison's disease proves fatal after a duration which has wide limits, namely, from six weeks to nine years. In the majority of cases death takes place within a year. The termination is invariably fatal, but temporary improvement is not uncommon. The mode of dying is usually by slow asthenia. Death sometimes takes place suddenly, after some exertion, by syncope.

---

[1] Trans. Clinical Society of London, vol. ix., 1876.

The treatment of Addison's disease has no reference to a cure, with our present knowledge. Symptomatic indications are to be followed, and sustaining measures are indicated. In a case seen by the author with Dr. Rockwell, the improvement under general electrization was remarkable. The patient, who was "barely able to crawl a single block," after thirty general applications of the faradic current, could walk a couple of miles without much fatigue, and engage in light labor. This state of improvement continued for two years, when, without apparent cause, suddenly his strength gave way, and death took place within twenty-four hours.[1]

LYMPHATIC ANÆMIA. HODGKIN'S DISEASE.

The first of the above two names was proposed by Hodgkin, who described the affection in 1832; the second is in honor of that physician, as he was the first to direct attention to it. Other names are—lymphadenoma, adenia or adenoid disease, and pseudo-leucocythemia. The distinctive pathological feature, in addition to the anæmia, is the enlargement of lymphatic glands from hyperplasia of their cellular constituents, and the formation of lymphatic tumors in situations where lymph-glands, normally, are not found. The affected glands may be greatly enlarged. They may undergo cheesy or fatty degeneration. If opened they discharge a milky liquid. The glands most frequently affected are the cervical; next in the order of frequency are the mediastinal, lumbar, inguinal, axillary, mesenteric, and the iliac. In a considerable number of cases the spleen is enlarged, either with or without the presence of lymphoid tumors, and in a smaller proportion of cases this is true of the liver. In a remarkable case of this affection, reported by Dr. James H. Hutchinson, there were two hundred and thirty-nine adenoid tumors, varying in size from a small pea to half a walnut, distributed over the surface of the body. In this case there were numerous tumors distributed over the surface of the brain, and also tumors within the spinal canal, one of which had compressed the cord and produced paraplegia. The cervical glands were greatly enlarged. Tumors were scattered over the peritoneal surface, but the spleen and liver were unaffected. The lungs contained over three hundred tumors, the size averaging that of a pea.[2]

It is held by distinguished authors, *e. g.*, Jaccoud, that this affection and leucocythemia are essentially identical. The latter name, however, cannot be affixed with propriety to cases of Hodgkin's disease in which there is no multiplication of the white corpuscles of the blood. The number of white corpuscles may not be greater than in health. That the two affections are allied to each other cannot be doubted, inasmuch as there is a close correspondence in the important events of the clinical history, as well as in the character and seat of the local pathological changes. The general symptoms are those of leucocythemia, namely, notable anæmia, progressive debility, emaciation, and an invariable fatal termination within periods varying from six months to four years. In the majority of cases death takes place within two years. Hemorrhages are of frequent occurrence, generally taking place from the nostrils or mouth; in some cases from the mucous membrane of the bronchial tubes and in other situations. During the progress of the affection there may be moderate fever with a slight exacerbation at night, or there may be a mild paroxysm of fever in the latter part of the day, the thermometer showing in the morning a normal temperature.

---

[1] For report of this interesting case, *vide* Medical and Surgical Electricity, by Drs. Beard and Rockwell, second edition, page 675. For an able article on this disease by Prof. William Pepper, *vide* Am. Jour. of Med. Sciences, April, 1877.

[2] *Vide* Transactions of the College of Physicians of Philadelphia, third series, vol. i. Accompanying the report of this case is an analysis of fifty-eight recorded cases.

The diagnosis is to be based on the character of the tumors, taken in connection with the general symptoms, other diseases being excluded, and among the latter leucocythemia by the fact that either there is no increase in the number of white corpuscles in the blood or the increase is not sufficient to constitute that disease. In the majority of cases the age is between ten and thirty years, but the affection may occur at any age. Statistics show a large preponderance of males.

The enlarged lymphatic glands may produce, by pressure upon adjacent parts, morbid effects which do not belong intrinsically to the affection. Pressing upon the trachea or bronchi, they may interfere with respiration and cause death from suffocation. Aphonia and embarrassed respiration may result from pressure on the par vagum or on the recurrent laryngeal nerve. Œdema of the lower limbs may be caused by pressure on the vena cava, and hydro-peritoneum by tumors which are so situated as to press upon the portal vein. Compression of the brachiocephalic veins may cause congestion and œdema of the face and upper extremities, and hydrothorax may arise from obstruction of the pulmonary veins.

The indications for treatment in cases of Hodgkin's disease are essentially the same as in cases of pernicious anæmia, Addison's disease, and leucocythemia, the objects being the palliation of symptoms and the prolongation of life.

LEUCOCYTHEMIA.

This is the last of four blood diseases characterized by notable anæmia, all having in common certain important symptoms, and each probably always ending fatally.

The pathological characteristic of leucocythemia, as expressed by the name, is a morbid excess in the number of the white corpuscles of the blood, or leucocytes. This morbid condition of the blood was first observed by the late Prof. Bennett, of Edinburgh, who in the report of a case in October, 1845, attributed the excess of the white corpuscles to a suppurative process in the blood. Prof. Virchow reported a case in November, 1845, and attributed the condition to an excessive multiplication of the white corpuscles. The term leucocythemia was subsequently proposed by Bennett, and the term leukæmia by Virchow. The latter term is used by German writers, but the term leucocythemia is commonly preferred by French, English, and American writers.

The average numerical relation of the white to the red corpuscles (1 to 335) varies considerably within physiological limits. The relative proportion of the former to the latter may be considerably increased during the acts of digestion, in pregnancy, etc. A considerable increase is also symptomatic of various diseases. The condition, however, is not only less marked, but it is of temporary duration. As a symptomatic event it is distinguished as leucocytosis. In leucocythemia, the proportion of the white to the red corpuscles is much larger than in the cases in which leucocytosis is symptomatic of other diseases, and, moreover, the condition is permanent. The proportion in well-marked cases varies between that of equality and 1 to 20. In the majority of cases it is less than 1 to 7. The increased relative proportion of the white corpuscles is not due wholly to their multiplication. The red corpuscles are notably diminished in number, that is, anæmia is an important pathological element.

In most, if not in all, cases of leucocythemia, either the spleen is greatly enlarged or there is enlargement of the lymphatic glands. The splenic enlargement may exist either with or without swelling of the lymphatic glands, and *vice versâ*. Cases in which the spleen is alone affected have been called cases of splenic leucocythemia, and cases in which the lymphatic glands are swollen without splenic enlargement have been distinguished as lymphatic leucocythemia. The term spleno-lymphatic leucocythemia denotes enlargement both of the spleen and the lymphatic glands. The lymphatic glands most frequently affected are the cervical, bronchial, axillary, inguinal, and mesenteric. The follicles of the tonsils, together with the solitary and agminated glands of the intestine, are affected in some instances, hence, the name intestinal leucocythemia has been suggested as denoting a variety of the disease. New lymphatic formations in the liver and elsewhere are sometimes observed, as in cases of Hodgkin's disease. Attention has recently been directed to the fact that in some cases the marrow of bones contains white corpuscles in great abundance, and, on this fact is based the institution of another variety of the disease called myelogenic leucocythemia.

Of the foregoing local affections, the enlarged spleen and those of the lymphatic glands which can be examined by the touch or by inspection during life, are, of course, alone available for the diagnosis. But enlargement of the spleen and of the lymphatic glands occurs in other pathological connections, namely, splenic enlargement in cases of malarial disease, and enlargement of the lymphatic glands in syphilis, scrofula and Hodgkin's disease. Other evidence than that afforded by these affections is therefore essential for the diagnosis of leucocythemia. Nor can the diagnosis be based on persistent anæmia and the symptoms therewith connected. The diagnostic criterion is the positive proof of the multiplication of the white corpuscles obtained by means of the microscope. A drop of blood suffices. The relative proportion of the white and red corpuscles is ascertained by counting the number of each in the field of vision. At the same time a judgment can be formed of the diminution of the red corpuscles. The blood should be examined repeatedly at intervals, in order to determine that the condition is not transitory but permanent. Whenever either the spleen or the lymphatic glands are enlarged in a patient who has not had malarial disease nor syphilis, leucocythemia should be suspected, especially if the associated symptoms point to a grave affection; and, under these circumstances, the negative result of a single examination of the blood is not sufficient ground for saying that leucocythemia will not become developed, inasmuch as enlargement of the spleen or of lymphatic glands may precede the leucocythemic condition. It appears to be the rule, with some exceptions, that in splenic leucocythemia the white corpuscles have the size of the normal leucocytes, whereas, in lymphatic leucocythemia the corpuscles are smaller, and the blood contains free nuclei of the corpuscles in more or less abundance.[1]

The affection of the spleen, in cases of leucocythemia, is often accompanied by pain and a sense of fulness in the left hypochondrium. Enlarged bronchial glands may obstruct the primary bronchi, occasioning dyspnœa, and sometimes the obstruction is the immediate cause of death. Want of breath on exercise is one of the effects of the coexisting anæmia. Dropsical effusions may result from the pressure of enlarged glands on venous trunks, as in cases of Hodgkin's disease. The appetite is impaired or lost. Constipation is a symptom if the intestinal glands be unaffected, and, if involved, they give rise to diarrhœa. General debility, which is an early symptom, progessively increases. The patient becomes more and more emaciated. The mouth and throat, in some cases, become inflamed. Febrile paroxysms recur at irregular intervals, and, after a time, more or less fever is permanent. Hemorrhages from the nostrils and other situations are common, and often hasten the fatal termination. Cerebral hemorrhage is sometimes the immediate cause of death. Examinations of the urine show decrease of urea, increase of the urates and absence of albumen.

The affection is generally developed imperceptibly and insidiously, but in rare instances suddenly. Of the etiology, so little is known, that from this source nothing is derived suggestive of the diagnosis or bearing on the treatment. The duration is variable, the affection sometimes ending fatally within a few months, and in other instances continuing for several years.

The treatment, with our present knowledge, embraces palliative measures, following symptomatic indications, and measures of support with a view to the prolongation of life.

Phosphorus was advocated by Dr. Broadbent, of London, in 1875, as a remedy having a curative influence on this affection. A case reported by him, and a case subsequently by Dr. Wilson Fox, appeared to show notable benefit from this remedy. The observations, however, of Jenner, Moxon, Duckworth, and others, have failed to sustain the expectations based on the cases referred to.[2] Prof. Da Costa has reported two cases of fatal splenic leucocythemia in which hypodermic injections of ergotin diminished notably the enlargement of the spleen, improvement in other respects being also marked. Generally five, but sometimes ten, grains were injected every second day. Prof. Da Costa advises the following formula: forty grains of ergotin carefully mixed with thirty minims of glycerine, and enough distilled water added to make one hundred and twenty minims. Fifteen minims represent five grains.[1] In a case reported by Dr. F. C. Curtis, some diminution of the size of the spleen followed the exhibition of the iodide of potassium, there being no history of syphilis in the case.

---

[1] *Vide* paper by Prof. Edward G. Janeway, in the New York Medical Record, April 29, 1876.

[2] *Vide* Trans. Clinical Society of London, vol. x. 1877.

General Dropsy.

The term dropsy denotes serous transudation in the interstices of areolar or connective tissue, and into serous cavities. Dropsical effusion beneath the skin or mucous membranes, and in the parenchyma of internal organs, is called œdema. Œdema of the lungs is an exceptional instance in which the term is applied to a transudation into spaces not closed; the effusion in this affection being into the air-cells, strictly speaking it is not a dropsy. A dropsy is either local or general. An effusion confined to a single serous cavity is a local affection, and is designated by the name of the membrane with the prefix hydro. Examples are hydroperitoneum (ascites), hydrothorax, hydrocephalus, and hydropericardium. These local dropsies are considered in connection with the different nosological divisions to which they respectively belong. Hydrothorax has been already considered, and hydropericardium is embraced in the diseases of the circulatory system. Œdema is local when confined to a particular part or a limited space. Examples are œdema of the face, of the lower limbs, of the glottis, etc. Generalized œdema, that is, œdema extending over the subcutaneous areolar tissue of the body, is called anasarca or general dropsy. Local œdematous affections are considered in other divisions, leaving for consideration here general dropsy.

In general dropsy there is more or less œdema of the limbs, face, and trunk. The evidence that swelling, or an increase of size, is caused by œdema, is an indentation produced by pressure, and remaining for some time after the pressure is removed. This sign is best obtained by pressing with the finger where a bone is situated near the surface, as over the tibia and sternum. In the latter situation generalized œdema is ascertained when an increase of the size of the body may not be apparent to the eye. If there be considerable anasarca there is always more or less peritoneal and pleuritic effusion. The effusion into these serous cavities, as regards the quantity of effused liquid, bears a certain relation to the amount of œdema. If either the hydroperitoneum or hydrothorax be out of proportion to the anasarca, the inference is that there are local causes in addition to those giving rise to the general dropsy.

General dropsy is always a symptomatic event, and has no claim to be regarded as an individual affection aside from convenience. The existence of the dropsy is easily recognized; but the diagnosis should embrace its interpretation, or the different affections which stand in a causative relation to it. It is always an effect either of morbid changes in the blood, or of obstruction affecting the entire venous circulation, or of both these causes combined. If due to venous obstruction, it is almost invariably symptomatic of disease of the heart. It is then distinguished as cardiac dropsy. If due to blood changes, in a large majority of cases these are incident to disease of the kidneys. It is then called renal dropsy. Blood changes, however, leading to general dropsy, occur without renal disease; examples are its occurrence as a sequel of malarial disease and as incident to anæmia otherwise induced. These blood changes (hypoalbuminosis or hydræmia) dependent on albuminuria or other causes, and disease of the heart (tricuspid lesions or dilatation of the right auricle and ventricle) sometimes coexist, each having a share in the causation of the dropsy. The question then is, What are the points involved in distinguishing dropsy caused by morbid conditions of the blood from cardiac dropsy?

---

[1] *Vide* Am. Journ. of Med. Sciences, January, 1875.

Cardiac dropsy involves congestion of the systemic veins, and, hence, more or less cyanosis denoted by lividity of the prolabia and a dusky or leaden hue of the cutaneous surface. There is dyspnœa or want of breath on exertion, not sufficiently accounted for by either hydrothorax or pulmonary œdema. Moreover, physical signs show enlargement of the heart by dilatation, associated, in most cases, with mitral obstructive or regurgitant lesions. On the other hand, dropsy dependent on blood changes is generally accompanied by pallor and other evidences of anæmia; dyspnœa or the want of breath on exercise is in proportion to the effusion into the pleural cavities or the air cells, and if the physical signs of cardiac disease be not wanting, they do not denote those cardiac morbid conditions which have a special causative relation to general dropsy. In cases of dropsy dependent on blood changes and cardiac lesions combined, the relative amount of the causative agency of each is to be determined by means of the differential characters just stated; the predominance of the characters distinctive of either shows a proportionately greater agency. The nature and extent of the cardiac lesions, as determined by signs, are important with reference to this point of inquiry; and, if renal disease exist, the quantity of albumen in the urine is to be taken into account. It is important to estimate the relative agency of the cardiac lesions and the blood changes, in forming a judgment as to the prognosis and the prospects of benefit from treatment.

The treatment of general dropsy embraces two objects. To promote absorption of the effused liquid is one object. Another object, in general terms, is, if possible, the removal, and if this be impracticable, an abatement, of the conditions on which the dropsy depends.

Absorption of the effused liquid is promoted by remedies which diminish the water in the blood. The means for this end are those which eliminate water from either the intestines, the kidneys, or the skin. Hydragogue cathartics are the most prompt, reliable, and effective. Elaterium is the most efficient of the hydragogues. Given in doses of a sixth or an eighth of a grain, repeated every two or three hours, and suspended when purgation commences, this remedy acts potentially, and usually without undue prostration. It is especially indicated if either hydrothorax or pulmonary œdema be sufficient to cause notable dyspnœa.

Even if the patient be feeble, the relief afforded by abundant watery stools is often so great that they are followed by a sense of increased strength. If the indication be urgent, therefore, the feebleness of the patient does not contraindicate the employment of this remedy. The elaterium may be repeated after intervals of a few days, or it may be continued in doses sufficient to maintain daily a moderate hydragogue operation. Milder hydragogues may be used when the indication for relief is less urgent. The compound jalap powder (*pulvis purgans*) is an eligible hydragogue, operating efficiently without pain or nausea. The hydragogue effect may be increased by the addition of podophyllin. For a still milder effect the saline purgatives may be given, the sulphate, or the citrate of magnesia, and the tartrate of potassa and soda. The German bitter waters often answer well as a substitute for these.

Diuretics are much less prompt, reliable, and effective than hydragogue cathartics. They are comparatively slow in their operation, proverbially uncertain, and their effect is very rarely as great. Sometimes, however, they act efficiently. In general very little is to be expected from them if the dropsy depend on disease of the kidneys; the cases in which they act efficiently are cases of cardiac dropsy or of dropsy dependent on blood-changes not associated with renal disease. They are often useful after hydragogue cathartics have been employed, or when given alternately with the latter. They have the great advantage over hydragogues of interfering much less with alimentation, digestion, and assimilation. A combination of diuretics, which perhaps is as likely to prove effective as any other, is the infusion of digitalis—from two to four drachms given three or four times daily—and the bitartrate of potassa, the latter prepared in a palatable solution, and taken as a drink. Of other diuretics, those which are most likely to prove effective are juniper, broom (scoparius), squill, and parsley-root.

Elimination of water through the skin is the least effective, but, by no means without effect. Diaphoresis is to be resorted to when the stomach is intolerant of cathartics and diuretics. It may also be advantageous in alternation with these means. The best method of producing copious diaphoresis in cases of dropsy, is the hot-air bath. Of internal remedies, the jaborandi seems the most potential in producing profuse cutaneous transpiration.

An important injunction is not to push the use of either cathartics, diuretics, or diaphoretics too far in the treatment of general dropsy. When the dropsy has been so far reduced as not to interfere with important functions or occasion much inconvenience, it is often wise to suspend treatment having reference to the first object, and rely on measures for the second object, namely, the removal or abatement of the conditions on which the dropsy depends. The measures for the first object, that is, the removal or diminution of the dropsy, if too long persisted in, may conflict with the second object by their effect on assimilation, and by impairing the vital powers.

If the dropsy, despite the measures addressed to it, continue and increase, the limbs becoming enormously swollen, much relief is sometimes obtained by making numerous minute punctures, using for this purpose needles or pins, with points not too sharp, and making the punctures so slight as not to draw blood, but infinitely numerous over the lower limbs. Water drains away in large quantity, and the amount of dropsical effusion is sometimes much lessened. Spontaneous relief in some cases takes place from cracks or fissures in the skin. The author has known general dropsy to disappear in this way, without any measures of treatment having been pursued.

The diet is an important element in the treatment having direct reference to the dropsy. It is obvious that the end for which catharsis, diuresis, and diaphoresis are produced, will be counteracted by the introduction into the blood of as much liquid as is eliminated. The ingestion of fluids should be restricted as far as is consistent with the comfort of the patient. This part of the treatment may be carried too far. The diet should be dry, and drinks should be excluded to an extent to be determined by the ability of the patient to tolerate restrictions in these regards. Articles of diet which give rise to thirst are to be avoided.

The second object of treatment relates to the heart, kidneys, and blood changes. If the dropsy depend wholly on blood changes, cardiac and renal disease not existing, provided these changes are not connected with some other grave affection, as, for example, in cases of pernicious anæmia, they are removable, and recovery follows. In cases of general dropsy incident to simple anæmia, or occurring as a sequel of malarial fever, the prognosis is favorable. The treatment in these cases embraces tonic remedies, into which iron should enter, a nutritious alimentation, the judicious use of alcoholics, and the hygienic influences which tend to promote appetite, digestion, and general vigor. The treatment, in fact, is that indicated by impoverished blood. In cases of renal dropsy a cure may be expected if the affection of the kidneys be curable, as is acute parenchymatous nephritis. In the chronic incurable affections, judicious treatment may stay the progress of lesions and improve the condition of the organs, so that, if the dropsy be removed, it may not soon return. To lessen the excretion of albumen with the urine, and to increase the albuminous constituent of the blood, is to abate conditions which stand in a special causative relation to the dropsy. In cardiac dropsy, the conditions pertaining to the heart to which treatment is to be directed, are weakened and incomplete contractions of the muscular walls, especially of the right ventricle and auricle. Digitalis, and other remedies which increase the muscular power of the heart and render its action more regular, may postpone the recurrence of dropsy when it has been removed, or prevent its increase. As affecting the power of the heart's action, the condition of the blood is important: "A lame heart needs good blood."

A very important consideration, in its bearing on the treatment, is that dropsy, whether renal or cardiac, may occur in connection with incurable lesions of the kidneys and heart only when these are associated with other morbid conditions which may be abated, and perhaps removed. The lesions would not give rise to dropsy if, in other regards, the patient were healthy. Anæmia from impaired appetite, imperfect digestion, or other causes; exhaustion from over-exertion of body or mind, and coexisting disorders which induce debility, are often essential factors in the causation of dropsy dependent in a measure on renal or cardiac disease.

These associated causative conditions claim due attention in the treatment. The successful treatment of these conditions, after the removal of dropsy, may prevent its recurrence for an indefinite period.

PYÆMIA AND SEPTICÆMIA.

Pyæmia is an affection characterized by circumscribed and more or less numerous embolic inflammations, occurring especially in the lungs, but also in other organs, tending to suppuration (multiple metastatic abscesses), and in some instances to gangrene. The affection may be either acute or chronic, but in the majority of cases it is acute. Septicæmia is an affection, generally acute, in which embolic inflammations, or the so-called metastatic abscesses, are wanting.

Pathological and etiological questions of great interest and importance connected with these affections cannot be here considered. It may be remarked, however, that in both, the special cause is generally derived from parts which are the seat of morbid processes—suppuration, ulceration, decomposed blood, putrid exudations, and gangrene—and both, in the majority of cases, follow local injuries or surgical operations. They are also incident to the puerperal state. The chief anatomical point of distinction is the occurrence of thrombosis of the veins in parts affected prior to the pyæmic infection, the thrombi being detached and becoming emboli, the latter determining, in the situations in which they are arrested, the embolic inflammations. The latter involve probably, in addition to the mechanical obstacle to the circulation, the presence of septic matter transported by means of the emboli; hence, the significance of the term septico-pyæmia. It may be added, inasmuch as the fact has an important bearing, especially on prophylaxis, that late investigations render highly probable, if they do not demonstrate, the agency of vegetable organisms (bacteria) in the causation of both affections.

It follows from what has been just stated, that pyæmia and septicæmia belong especially to surgical and obstetrical medicine. The reader is referred to works in these departments of medical literature, and also to treatises on pathology, for a full consideration of these affections. They occur, however, in connection with various local diseases which belong to medicine proper, coming therefore under the cognizance of the physician as well as the surgeon and obstetrician.

Pyæmia commences with a chill which is well pronounced and accompanied by rigors. Intense fever follows, the temperature rising from five to eight degrees above the normal standard. After a few hours, sweating takes place, and the temperature falls to the normal standard, or even lower. A succession of chills ensue either daily or at shorter intervals, without regularity, followed by fever and sweating. The pulse becomes frequent and feeble. The skin is sallow and the conjunctiva may show distinct yellowness. Nausea, vomiting, and diarrhœa are not infrequent. The pulmonary embolic inflammations render the frequency of the respirations out of proportion to the pulse. Coexisting pleuritic inflammation may cause lancinating pains in the chest. Inflammation within the joints is a frequent concomitant, and may give rise to pain, tenderness, and swelling. General prostration is marked and progressive. The affection ends fatally in a large majority of cases, after a duration of from one to two weeks. Physical exploration of the chest may show dulness on percussion in circumscribed spaces, with moist râles, and sometimes pleural friction murmur.

These are the diagnostic symptoms of acute pyæmia. In a subacute and chronic form it may continue for weeks, or even months. The joints are oftener and more prominently affected in these cases, and large collections of pus beneath the skin and internally are not uncommon, recovery taking place but rarely.

Acute septicæmia commences suddenly, but not always with a chill. The fever speedily becomes high, and is either continuous or there are slight remissions. It continues without recurring chills. Perspirations occur in the early part of the disease. Diarrhœa and yellowness of the conjunctiva are occasional symptoms. Prostration is great, and passive delirium, as in typhoid fever, is common. The duration is shorter, death taking place usually within a week. The disturbance of respiration is in proportion to that of the circulation, and the physical signs of pulmonary disease are wanting.

Cases of mild septicæmia are probably not infrequent in which the termination is in recovery. It may be conjectured that this affection accounts for the fever and other constitutional symptoms occurring in connection with not a few local diseases.

The differential points, contrasting acute pyæmia with acute septicæmia, are the series of chills in the former, and the evidence of pulmonary embolic inflammations; in the latter, the continuous fever without chills, the delirium, and the shorter duration. Considering, however, that acute pyæmia involves the presence of septic matter, it is not inappropriate to embrace the two affections under one heading. The term pyæmia, with our present knowledge, being evidently inappropriate, septicæmia might include both affections, cases characterized by venous thrombosis and embolism being distinguished as cases of embolic septicæmia. It is claimed that there is an etiological distinction, namely, pyæmia and septicæmia are caused by different varieties of bacteria.

In the diagnosis of both affections, the fact of the acute symptoms having followed injuries and surgical operations, or supervening upon certain recognizable local diseases, is to be taken into account. When causative local conditions are not discoverable, each, but more especially septicæmia, is liable to be confounded with other diseases, namely, typhoid or typhus fever, acute atrophy of the liver, and rheumatic fever. The diagnosis of these affections remaining to be considered, it must suffice to say here that they are to be excluded by the absence of symptomatic characters by which they are severally distinguished.

Pyæmia and septicæmia cannot be controlled by any known remedies. The treatment must consist, first, in fulfilling symptomatic indications, and second, in supporting the powers of life. The latter is the chief object of treatment with our present knowledge.

The prophylaxis is a subject of great importance. The theory that living organisms are essential factors in the production of these affections, either by their direct action, or by generating the septic matter, has led to the employment of antiseptics—carbolic, salicylic, and boracic acid—which are supposed to prevent the affections by destroying the organisms or their germs. Whether the germ theory be accepted or not, observations show that the causes of these affections may be derived from those affected with the same or with other diseases. Hence in the surgical wards of hospitals, in addition to the ordinary hygienic regulations, such as avoidance of overcrowding, free ventilation, and the like, the antiseptic treatment in cases of injuries and surgical operations has apparently been of immense service in preventing these affections. The disinfection of wards in hospitals, lying-in institutions, and also of sick rooms in private houses, belongs to the prophylaxis of these affections.

SCORBUTUS. PURPURA HÆMORRHAGICA. HÆMATOPHILIA.

Scorbutus or scurvy, and purpura hæmorrhagica, closely resemble each other in certain symptomatic features; but from a clinical and an etiological standpoint they are to be regarded as distinct affections. In respect of their pathology, the essential blood changes are yet to be determined. Of the causes of scorbutus, certain facts are known, which constitute the basis of successful treatment, whereas, very little is known of the causation of purpura. Both affections are to be distinguished from purpura simplex which is reckoned among the cutaneous diseases, and from the petechiæ which are incidental to various diseases, more especially, typhus and typhoid fever, smallpox, urticaria, and cerebro-spinal meningitis. The resemblance to these and other diseases extends no further than the occurrence occasionally of minute ecchymosis in the skin, or petechiæ, other diagnostic symptoms of scorbutus and purpura hæmorrhagica being absent. These diagnostic symptoms, in connection with purpuric spots on the skin, render it easy to decide in individual cases that the affection is either scorbutus or purpura hæmorrhagica. It remains then to differentiate the one from the other. With a knowledge of the differential points this is not difficult.

Scorbutus.

The diagnostic characters of scorbutus are preceded for a period varying from a few days to several weeks by symptoms denoting deterioration of health, namely, indisposition to exertion, a sense of debility, diminished power of endurance, pallor, mental depression and pains in the limbs or joints. The articular pains are sometimes so marked as to simulate rheumatism.

The affection is declared, in the great majority of cases, by a stomatitis characterized by a fungoid swelling of the gums. The teeth are sometimes almost concealed by the swollen gums which bleed spontaneously or on the slightest pressure. In severe cases ulcerations follow, the teeth become loosened and may fall out. Caries of the maxillary bones is an occasional event. The breath has an intolerable fetor which differs from that peculiar to mercurial stomatitis.

Coincident with, or speedily following, the occurrence of the stomatitis, ecchymoses appear upon the skin. These are more or less numerous. Large patches of skin discolored by diffused blood (vibices) are common. Hæmorrhagic extravasations occur beneath the integument and between the muscles, forming tumors which are liable to lead to ulcerations presenting a livid aspect and granulations which bleed on slight contact. Hemorrhage takes place from the mouth, nose, and other mucous surfaces. Pain in the limbs and joints becomes more severe. General debility increases, and muscular exertions are liable to give rise to syncope which may prove the immediate cause of death. The patient complains of thoracic pains and a sense of oppression referable to the chest. Ulcers which had cicatrized long before, sometimes reopen, and the epiphyses of bones have been known to become detached. The infiltration of blood in the lower limbs in some instances is so great as to cause much increase of size with a black discoloration of the skin (scorbutic black leg). Enlargement of the limbs may take place from œdema, and there may be anasarca. The pulse is weak and compressible, the frequency sometimes increased and sometimes diminished. The intellect generally is unaffected. Unless complicated with some local inflammatory affection, fever is wanting.

Aid in the diagnosis is derived from our knowledge of the causes of scorbutus. Although the essential pathology is still *sub judice*, the special morbid changes in the blood are undoubtedly due to an insufficient supply of certain alimentary principles which are contained in fruits and vegetables. Hence, the development of the affection during long voyages, in armies, and when, under other circumstances, the diet for a considerable period has been greatly restricted to meat whether fresh or salted. The diagnosis is corroborated if investigations show an adequate dietetic causation. In judging of this, it is to be considered that auxiliary causes —exposure, over-exertion, mental depression, etc.—contribute more or less to the development of the affection.

The prime object in the treatment of scorbutus is to meet the requirements of assimilation. Nothing can take the place of the dietetic treatment. If the selection of articles of diet be unrestricted, it is judicious to follow the instincts of the patient, selecting the vegetables and fruits which are craved. Potatoes, turnips, the edible greens, apples, pears, and grapes are efficacious articles of diet. Vinegar is generally acceptable and is useful. Lemon and lime juice have long been known as valuable anti-scorbutics. The combinations and preparation of food should be adapted to the taste and digestive powers. The stomatitis rendering mastication difficult or impracticable, milk and eggs, if available, should be given as substitutes for solid food. In military service, exploring expeditions, travels, etc., when the most eligible articles of vegetable food or fruits cannot be procured, wild, edible plants which do not enter into ordinary diet should be sought after.

The treatment, aside from that relating to dietetics, embraces tonic remedies, with local applications to the mouth, the swellings from extravasated blood and ulcerations. Astringent applications are indicated if hemorrhage take place in situations which are accessible. Alcoholics should be given with reserve, owing to an increased susceptibility to alcoholic excitation in some cases. Accessory causes are to be removed as far as practicable, and much importance belongs to favorable hygienic agencies. The salts of potassa—the bitartrate and the chlorate—are thought to have a curative, and, also, a protective, effect.

Convalescence from scorbutus is apt to be slow. The prognosis is favorable if the indications for treatment can be fulfilled. Death may be caused by syncope, by intercurrent pleurisy or pericarditis, by intracranial extravasation of blood, and by profuse hemorrhages from the bowels.

Scorbutus is preventable. A full and varied diet, with adequate digestive and assimilatory powers, affords an infallible protection against it. Its occurrence in armies, on shipboard, and in public institutions is proof of defective dietetic provisions for health. At this day, when canned vegetables and fruit can be preserved for an indefinite time and easily transported, necessity is the only valid excuse for the development of the affection.

In connection with this affection several important facts are to be borne in mind by the practitioner.

It may be associated with other affections, forming a grave element, which is to be recognized and to receive appropriate treatment.

It is, so to speak, the culmination of a defective assimilation which has been going on for some time, recognition and proper treatment of which would have forestalled its occurrence.

It occurs in private practice, sometimes, among children and adults who, from erroneous ideas relating to diet, suffer in various ways from insufficient alimentation. Extreme abstemiousness and a restricted range of diet, practised as a means of preserving health, may induce it. Instances, it is true, are rare, but they are occasionally met with. In general, other evils than scorbutus result from popular dietetic errors to which reference is made in other connections.

Purpura Hæmorrhagica.

The clinical history of this affection, as contrasted with scorbutus, offers the following points of disparity: the stomatitis, which is very constantly, although not invariably, present in scorbutus, is wanting. Bloody infiltrations beneath the skin, and extravasations between the muscles rarely occur. More or less fever of a remitting type accompanies it. It is not so uniformly and closely referable to defective alimentation. There is reason to think that the pathology has relations to the capillary bloodvessels rather than to the condition of the blood. In the majority of cases the subjects are young. With these points of difference, it resembles scorbutus in the occurrence of petechiæ, vibices, and hemorrhages in different situations, namely, the nostrils, mouth, pharynx, bronchial tubes, intestines, and the kidneys.

The diet should be nutritious or sustaining in cases of purpura hæmorraghica, but the antiscorbutic articles of food are not specially indicated. The salts of quinia, sulphuric acid, and the astringent preparations of iron are remedies the value of which experience has attested.

To these may be added gallic acid, with a view to restrain hemorrhage, and ergot. The latter has apparently been found useful. Rest is important. Recovery takes place in the majority of cases. The cases in which death takes place within a few days, are characterized by high fever with typhoid symptoms. If the duration be longer, the patient generally dies from persistent and profuse hemorrhages.

Hæmatophilia.

Hæmatophilia and Hæmophilia are terms which denote a congenital hæmorrhagic diathesis. Fatal umbilical hemorrhage in the newly born is attributable to this diathesis. Generally, it is not manifested in the first few months after birth, but during the first or second year, and the manifestation may be delayed for several years. The diathesis diminishes with age.

In persons with this innate disposition to hemorrhage, a continued oozing of blood follows slight wounds, such as those produced by minute punctures, the extraction of a tooth, vaccination, and superficial abrasions of the skin or a mucous surface. The hemorrhage is with difficulty arrested, and it may continue in spite of hæmostatic measures, inducing notable anæmia, and sometimes causing death. The loss of blood from deep incised wounds is less than from those which are in themselves trifling. The hemorrhage, indeed, has been arrested by converting a small wound into one of larger size. Surgical operations are sometimes unattended by immediate danger, but there is a liability to secondary hemorrhages which may prove serious. Persons with this diathesis are liable to spontaneous hemorrhage, especially from the nostrils, and, also, from the gums, throat, lungs, stomach, intestines, and urethra. In women it determines profuse menorrhagia. Cases have been reported in which persistent hemorrhage took place from the ears and from the skin without any appreciable solution of continuity. Ecchymoses into, or beneath, the skin are produced by slight bruises. Extravasations may lead to bloody tumors of greater or less size.

The diathesis in a considerable proportion of cases is inherited. Families in which it is transmitted have been known in some parts of this country as *bleeders*. The majority of those who have it are males. It is rarely extinguished prior to the age of thirty or forty years.

There are no rational indications for the treatment of Hæmatophilia based on its pathology. Its pathology is unknown. That the morbid condition of the blood consists in a deficiency of fibrin, or in its diminished coagulability, as has been heretofore supposed, seems to have been disproved. It is, perhaps, reasonable to consider the capillary vessels, rather than the blood, as the seat of the affection. Nor does our knowledge of the etiology, aside from heredity, furnish any clue to measures for the extinction of the diathesis. Experience has not led to the discovery of effective means for the accomplishment of this object. All that can be said, therefore, under this heading is, that symptomatic indications proper to individual cases are to be followed, and the system is to be invigorated as far as possible by hygienic treatment.

Whenever hemorrhages occur, efforts to arrest it are, of course, indicated. For this end, the internal hæmostatics, namely, astringent preparations of iron, gallic acid, and ergot, are to be prescribed, together with local styptics, compression, and cold. Gintrac recommends as especially efficient, the douche in the form of numerous jets of cold water (*bains de pieds à épingles*) applied with force to the lower extremities.[1]

---

[1] *Vide* Nouveau Dictionnaire de Médecine et de Chirurgie Pratiques, 1873, art. Hémophilie.

Patients with this diathesis, from the occurrence and recurrence of hemorrhage, become anæmic, and require the treatment thereby indicated.

Important morbid conditions of the blood will enter into the consideration of different local diseases, especially of the liver and kidneys. The presence of bile constituents (cholæmia) is incident to diseases of the liver and biliary passages, giving rise to icterus or jaundice. The retention in the blood of certain excrementitious principles, in consequence of suppression of the biliary secretion, especially or chiefly cholesterine, is an important morbid condition (*acholia*) (*cholesteræmia*) incident to diffuse hepatitis or yellow atrophy of the liver and other hepatic affections.[1] The accumulation of urinary principles in the blood (uræmia), is an important event incident to certain diseases of the kidneys.

II.

INFLAMMATORY DISEASES OF THE HEART.

ACUTE PERICARDITIS, SUBACUTE AND CHRONIC PERICARDITIS, PNEUMO-PERICARDITIS, ENDOCARDITIS, ULCERATIVE ENDOCARDITIS.

THE pericardium, the endocardium, and the structures which compose the walls of the heart may separately be the seat of inflammation. Inflammation of the walls of the heart (myocarditis) very rarely occurs independently of pericarditis or endocarditis. Either the muscular or the interstitial structure, separately or combined, may be the seat of a myocarditis which is primary, that is, not secondary to any other cardiac disease. The inflammation may be circumscribed or more or less diffused. It may lead to suppuration and the formation of abscesses which may open into the pericardial sac or into one of the cavities of the heart. The inflammation may be either acute or chronic. The latter gives rise to induration and muscular atrophy in consequence of morbid growth of the interstitial tissue. Perforation of the heart and aneurism of its walls are among the effects of myocarditis. Abscesses in the walls of the heart sometimes occur in pyæmia, and they may be caused by emboli which, derived from pulmonary ulcers, become lodged in branches of the coronary arteries. Chronic myocarditis may be caused by syphilitic disease. Beyond these statements, myocarditis will not be considered in this work, for the reason that it cannot be diagnosticated with any degree of certainty. Pericarditis occurs either as an acute or as a subacute and chronic affection. These forms will be considered separately.

---

[1] *Vide* "The Excretory Function of the Liver, by Austin Flint, Jr., M.D.," in Transactions of the International Medical Congress, Philadelphia, 1876, p. 489.

ACUTE PERICARDITIS.

The symptoms of acute pericarditis are generally combined with those of other diseases with which it is associated. As an idiopathic affection it is extremely rare. The symptoms of the associated diseases may obscure or overshadow those of the pericardial inflammation, and hence, it happens not infrequently that the latter is discovered in post-mortem examinations when its existence had been overlooked during life. It is therefore important to bear in mind the most frequent pathological connections. It is associated with acute articular rheumatism oftener than with any other disease. It occurs in connection with acute pleurisy and pneumonia. It is one of the local effects of uræmia. It is a rare complication in cases of pyæmia, scorbutus, and the different essential fevers. It may be due to traumatic causes, more especially to penetrating wounds of the chest. Exclusive of these relations, it is certainly one of the rarest of affections.

The diagnosis should embrace more than the fact of the existence of the affection. With reference to prognosis and treatment, the importance of recognizing the different conditions belonging to its successive stages is great. This statement applies particularly to the presence or absence of liquid effusion within the pericardial sac, and the variations in the quantity of liquid.

Diagnostic Symptoms of Acute Pericarditis.

The symptoms which bear upon the diagnosis of acute pericarditis relate to pain, tenderness, the action of the heart, respiration, deglutition, voice, and the facies.

Pain referred to the præcordia, is usually coincident with the commencement of the inflammation. It varies in different cases greatly in degree, being sometimes severe, and even excruciating, sometimes slight with every intermediate gradation, and it is sometimes wanting. The pain is sharp, burning, or lancinating, and it may have something of the character of angina pectoris. It is increased by deep inspirations. It may not be easy to discriminate the pain from that of acute pleurisy or pleuro-pneumonia when these affections coexist, and, if relied upon for the diagnosis, the pain might lead to the error of supposing the existence of one of these affections when neither is present. Pain belongs to the first stage of acute pericarditis, that is, prior to the effusion of liquid; it diminishes or ceases when the latter takes place.

Tenderness on pressure over the præcordia, in the first stage, is more or less marked. This may continue after the effusion of liquid, and it may then be more or less marked in the epigastric region owing to the depression of the base of the pericardial sac.

The action of the heart may be increased in force, as well as in frequency, in the first stage, as determined by the cardiac impulse and the pulse. When considerable effusion has taken place, the action is weakened; the pulse becomes small, feeble, not infrequently irregular, owing to the compression of the heart. As a rule the frequency is notably increased.

The respirations are increased in frequency, in the first stage, from the increased frequency of the heart's action, and the diminished expansion of the lungs on account of pain. The frequency is further increased after effusion, and, other things being equal, the increase is in proportion to the quantity of the effused liquid. If the effusion be large, the patient suffers from dyspnœa, and may be unable to maintain the recumbent position (orthopnœa). There is then suffering from a sense of oppression referred to the præcordia. The dyspnœa may be, in part, attributable to pressure on the trachea, or the left primary bronchus. Difficulty of deglutition, especially in the recumbent position, may be caused by the pressure of the distended pericardial sac upon the œsophagus.

Huskiness of the voice and aphonia are sometimes caused by the pressure of the pericardial sac on the left recurrent laryngeal nerve, or, it may be, on the right as well as the left.

The facies has an expression of suffering in proportion to the pain. The expression is that of anxiety in proportion to the sense of dyspnœa and præcordial oppression. The mechanical compression of the heart may occasion lividity and enlargement of the cervical veins. Pulsation of these veins is sometimes observed.

With this tableau of diagnostic symptoms, a positive diagnosis cannot be made without the exclusion of cardiac lesions and pulmonary affections. The exclusion of these requires the aid of physical signs; hence, confessedly, prior to the employment of auscultation and percussion, pericarditis could be "guessed at," but not confidently diagnosticated.

Physical Signs of Acute Pericarditis.

The reliance for a positive early diagnosis must be on the presence of a pericardial friction murmur. This sign is almost invariably present, and it may be discovered very soon, sometimes even within a few hours, after the commencement of the disease. The distinctive characters of this murmur have been stated (*vide* 174). The most important characters are, its being generally double, that is, accompanying both sounds of the heart, although not in exact rhythmical accord with these sounds; its rubbing character resembling the friction of roughened or sticky surfaces; its apparent source near the surface of the chest; its limitation to a part or the whole of the præcordial area, and its intensification by pressure with the stethoscope. The murmur is to be differentiated from the aortic direct and regurgitant murmur combined. It can hardly be confounded, by one who has any practical knowledge of cardiac signs, with the combination of the mitral and the aortic regurgitant murmur. The liability to the occurrence of a double cardiac pleural friction murmur, without pericarditis, in some cases of pleurisy or pleuro-pneumonia, is to be borne in mind (*vide* page 175). The pericardial friction murmur diminishes, and may not be discoverable, after considerable liquid effusion has taken place. It returns when the quantity of liquid is lessened sufficiently for the pericardial surfaces to come again into contact with each other.

When sufficient effusion has taken place for the friction murmur to disappear, reliance for the diagnosis must be on the signs showing the presence of liquid in the pericardial sac, taken in connection with the history and symptoms. Moreover, to ascertain the presence and the quantity of effused liquid is an important part of the diagnosis. To determine that the pericardial sac is filled with liquid, is not a difficult problem in physical diagnosis, provided pleurisy with effusion does not coexist. Percussion shows pericardial dulness increased in degree, perhaps even flatness, and extending over an enlarged area which, in situation, size, and form, corresponds to the distended pericardium. This area, delineated on the chest, represents a conical figure, the base extending below the lower boundary of the præcordia in health, and the apex rising nearly to the sternal notch. This area may be determined by auscultation of the voice as readily as by percussion. The boundaries are denoted by an abrupt cessation or notable diminution of the vocal resonance. The respiratory murmur over the pericardial sac is wanting, except when transmitted from beyond the boundaries of the sac.[1]

If there be much liquid effusion, the heart sounds on auscultation seem to be distant, and the first sound is shortened, weakened, and valvular in quality. The author has been led to seek for other signs which disclosed pericarditis in a case in which it had not been suspected, by observing these characters pertaining to the heart sounds.

On palpation, if the effusion be large, the impulse of the heart generally cannot be felt. If discoverable, it is situated above the normal situation of the apex beat, namely, in the fourth or third intercostal space, usually to the left of the *linea mammalis*. In young subjects the effusion of liquid may be sufficient to cause a projection of the præcordial region, apparent on inspection and determinable by mensuration.

By means of the signs obtained by percussion and auscultation, the daily increase of liquid until the effusion reaches its acme, and its subsequent diminution from day to day, may be ascertained without difficulty, and with great precision. As the liquid is absorbed, the area and the degree of præcordial dulness lessen, the heart's impulse is stronger, the apex gradually falls to the normal situation, the friction sound returns, becoming louder and rougher than before its suppression, the heart sounds seem again near the ear, and the normal characters of the first sound are resumed.

An important fact in the history of acute pericarditis is that it may be associated with certain disturbance of the nervous system which, without knowledge of the fact, will be likely to engross the attention of the practitioner, leading him to overlook the cardiac affection. More than twenty years ago the author reported a case in which the affection was accompanied by delirium, characterized by taciturnity, together with manifestations of delusions relating to the commission of crime, and eventuating in coma, the absence of appreciable intracranial disease being ascertained after death.[2] Cases previously and subsequently have been reported. Chorea or choreiform movements and tetanoid symptoms have also been observed. These cases enforce the importance of a physical examination of the heart, although there may not be present symptoms pointing directly to disease of that organ. In fact, it is a good rule, in the full investigation of all cases of disease, not to omit this examination.

---

[1] Dr. T. M. Rotch, from a few clinical observations and experiments on the cadaver, concludes that the pericardial sac, when filled, causes flatness in the fifth right intercostal space. This was true in a case under the author's observation, since the publication of Dr. Rotch's paper in the Transactions of the Massachusetts Medical Society for 1878.

[2] *Vide* Treatise on Diseases of the Heart, 2d edition, p. 354.

The coexistence, as a rule, with few if any exceptions, of endocarditis with pericarditis associated with rheumatism, is a fact to be borne in mind. The physical signs of the former are then combined with those of the latter.

Treatment of Acute Pericarditis.

In the great majority of cases the treatment of acute pericarditis must have reference not alone to the pericardial inflammation, but to associated diseases. As an isolated affection it is so extremely rare that to collect a sufficient number of cases for analysis, in order to obtain data for prognosis and the comparative efficacy of different therapeutical measures, would be difficult and probably impossible. In the effort to make such a collection from the records of medical literature, it would be useless to go further back than the last half century, inasmuch as, prior to the discovery of the pericardial friction murmur, a positive diagnosis in the early stage was impracticable. The relations of the pericardium to the heart invest the affection with important peculiarities; but, aside from these, the affection is analogous to other serous inflammations, for example, acute pleurisy.

The therapeutical indications and objects differ materially in the different stages. Prior to the effusion of liquid, pain, the excited action of the heart, and the pyrexia are especially to be considered. With the present prevailing ideas in relation to general bloodletting, this measure should be rarely resorted to. The cases in which it is admissible are those in which the affection is uncomplicated, or, if associated with rheumatism or renal disease, when the condition of the patient otherwise is such as not to furnish contraindications for its employment. It is certainly never indicated under circumstances which would render it of doubtful expediency in any other acute inflammatory affection. And there is an important consideration which would seem to render the abstraction of blood in any considerable quantity liable to do harm, although the immediate effect might seem salutary, namely, after much effusion has taken place the heart acts under a direct mechanical obstacle, and hence a reason why its muscular power should not be impaired. The author is unable to speak of either the advantages or evils of bloodletting in this affection from his own experience.

The local abstraction of blood by leeches has its advocates who have formed opinions from their own experience.[1] That the pain and sense of oppression are thereby in most cases relieved or removed, sometimes temporarily and sometimes permanently, is undoubtedly true. The judicious use of opium, however, will probably in most cases produce the same result, although less promptly. Holding this opinion, opiates are to be preferred to local bleeding. They may be administered by the mouth or hypodermically. The ice-bag applied to the præcordia has not come into much use in this country. It is used by German physicians, and is said to afford often prompt relief of pain. This is not inconsistent with the fact that warm applications, made by means of a poultice, the water dressing, or spongio-piline, relieve the pain. It is safe to be guided by the patient's own sensations as to the choice between cold and warm applications, after a trial of each, and they may be applied in alternation. Sinapisms give some relief, and are unobjectionable, but blisters are not to be recommended. To say the least, they are liable to cause discomfort.

---

[1] *Vide* the elaborate treatise by the late Dr. Sibson in Reynolds's System of Medicine, vol. iv. p. 877.

To relieve undue excitation of the heart, digitalis and aconite may be employed, observing caution as regards doses, and watching the effect, especially during the progress of effusion.

A high temperature, which is rarely due to the pericarditis, but to coexisting disease, is an indication for full doses of quinia.

If the pericarditis be developed in connection with rheumatism, alkalies should enter into the treatment; and, occurring in cases of renal disease, the elimination of urea or its products by the intestines, kidneys, or skin is a rational therapeutical object, taking care not to push means for that object so far as to produce disturbance or impair the vital powers.

Thus far the treatment relates to the first stage, that is, prior to liquid effusion. The duration of this period may be short, embracing, perhaps, only from twenty-four to forty-eight hours. If the effusion occasion much embarrassment of the heart's action, as denoted by weakness of the pulse and disturbance of respiration, the important objects of treatment are, prevention of further increase of the liquid and the promotion of absorption. These objects call for diuretics or hydragogue cathartics; but care is to be taken not to push these remedies so far as to do harm in the way of perturbation and prostration. They are not indicated by the fact that there is considerable effusion, provided it do not occasion much distress. Painting the præcordia with the tincture of iodine is a harmless procedure, and perhaps does something toward promoting absorption. Mercurialization, as a means of limiting exudation or serous effusion, and of aiding in their removal, is, at the present time, rarely advocated, and probably with good reason. An excessive accumulation of liquid may call for paracentesis pericardii, which certainly should be resorted to if danger to life be imminent. It is rarely indicated in acute pericarditis, and it will be referred to in connection with the chronic form of the affection.

Alimentation and alcoholics, that is, sustaining measures, are indicated precisely as in other affections, in proportion as symptoms denote asthenia. The danger which is connected with the cardiac affection lies in that direction.

The prognosis in cases of acute pericarditis, depends greatly on the associated diseases. It is vastly more unfavorable in cases of renal than in rheumatic pericarditis. The affection is a grave complication in cases of pleurisy and pneumonia. It proves fatal when it is connected with pyæmia and scorbutus. The unfavorable prognostics which relate directly to the heart, are symptoms denoting failure of its muscular power, and the effects of compression on the heart and pulmonary organs by a large effusion of liquid. There is a liability to sudden death from syncope after muscular exertion, and, therefore, absolute quietude should be enjoined. An instance of sudden death caused by getting out of bed to go to stool, and another instance caused by suddenly rising in bed under the excitement of severe pain, have fallen under the author's observation.

Some cases of rheumatic pericarditis pursue a favorable course, without severe symptoms, and require nothing more than palliative treatment. Disconnected from other affections, in healthy subjects, it probably tends intrinsically to recovery. The danger is great if it occur in a patient suffering from valvular lesions with enlargement of the heart.

During convalescence from acute pericarditis, the avoidance of exercise and other causes of excited action of the heart should be enjoined. Complete recovery does not take place until the lymph is absorbed, and, if pericardial adhesions from newly formed tissue have followed, when they have acquired a certain degree of strength. These adhesions, if the heart be sound, are not incompatible with health.

The full alkaline treatment in cases of acute rheumatism, and eliminative treatment in cases of Bright's disease, when examinations of the urine show a deficiency of urea, are to be regarded as important in the way of prophylaxis.

SUBACUTE AND CHRONIC PERICARDITIS.

Subacute Pericarditis.—The inflammation in some cases of rheumatic pericarditis is so slight that there are no subjective symptoms referable to the heart, the existence of the affection being revealed by a pericardial friction murmur. There may be no appreciable quantity of effused liquid (dry pericarditis). Recovery takes place without any untoward event. The author has met with cases of this description in connection with subacute articular rheumatism, and also a case in which the pericarditis was caused by a contusion of the præcordial region. In the way of treatment, if associated with rheumatism, alkaline remedies—the bicarbonate of potassa or soda—should be given in sufficient doses to maintain alkalinity of the urine, and rest enjoined, in order to prevent the affection from becoming acute. If the pericarditis be idiopathic or traumatic, under the circumstances stated, rest alone suffices without remedies.

With subacuteness of inflammation, as shown by the local and general symptoms, there may be more or less effusion of liquid. If this occasion much inconvenience, or if absorption be slow, diuretics or mild hydragogues may be given when not contraindicated by the condition of the patient in other respects.

Chronic Pericarditis.—Acute may eventuate in chronic pericarditis, or the inflammation may have been from the first subacute.

There is a form of chronic, following acute, pericarditis, characterized by layers of lymph between the pericardial surfaces, causing adherence of the latter by agglutination, liquid, which had previously existed, having been absorbed. The lymph adds somewhat to the size of the heart. This form of the disease may be inferred when the local and general symptoms denote persistence of pericardial inflammation, the signs showing some enlargement of the pericardial area and the absence of liquid in the pericardial sac. If, however, there be valvular lesions with enlargement of the heart, the inference must be based on the symptoms irrespective of signs, taking into account the fact that acute pericarditis has existed. It is possible under these circumstances that a pericardial friction murmur may persist.

Sooner or later this form of chronic pericarditis ends fatally, the fatal termination being due, not exclusively or directly to the pericardial inflammation, but to changes in the muscular walls incident to the percarditis, and, also, often to coexisting valvular lesions.

The treatment consists of palliative and sustaining measures.

Generally in chronic pericarditis the pericardial sac contains more or less liquid which in most instances is sero-fibrinous, as in the majority of cases of the acute affection; it is sometimes purulent, and sometimes bloody (hæmorrhagic pericarditis). The quantity of liquid in some cases is very large and even enormous. The pericardial sac is capable of immense dilatation; it may contain more than a gallon of liquid.

The diagnosis is to be based on the physical signs showing the presence of liquid in the pericardial sac (*vide* page 200). If the sac be greatly dilated, it may occupy a large share of the thoracic space, the lung on either side being crowded into the lateral portion. A pericardial friction murmur is sometimes discovered notwithstanding the quantity of liquid is very large. A largely dilated pericardial sac can hardly be confounded with cardiac enlargement, and attention to the differential points will prevent the error of mistaking for the latter a moderate or a considerable accumulation of liquid, and *vice versa.* A case in which the pericardial sac is filled with a cancerous mass enveloping the heart, is not readily distinguished from one of pericardial effusion. The author has reported such a case.[1] From their great infrequency, however, cases of this kind may almost be ignored practically in diagnosis. An exploratory puncture would prevent the error.

The physical signs which demonstrate the presence of liquid, as well as approximately its amount, do not declare its character, that is, whether it be serous, purulent, or hæmorrhagic. This can only be positively determined by an exploratory puncture to which there can be no objection when it is important that the question be settled; and the question may be one of importance with reference to treatment.

The prime object of treatment is the removal of the liquid. The means for effecting this object by absorption, have been referred to in connection with acute pericarditis. The precautions to be observed in the employment of these means in the acute claim still more attention in the chronic affection. The author has observed one case in which apparently death was hastened by the employment of elaterium to promote the absorption of liquid in a case of chronic pericarditis with large effusion. If the liquid be purulent, these means—diuretics, hydragogues, and diaphoresis—will be of no avail; hence the importance, before resorting to these means, of ascertaining the character of the liquid by an exploratory puncture.

The removal of the liquid by aspiration is to be here considered. The cases in which this measure has been resorted to, up to the present time, are not very numerous, but they are sufficiently so to show its safety and its value. It is now about twenty-five years since Bowditch inaugurated and demonstrated the value of this method in cases of pleurisy, and it is only within the past few years that the great improvement for which practical medicine is indebted to him, has come to be adequately appreciated. At the present moment, to puncture the chest and withdraw pus or serum from the pleural cavity, is regarded as a trivial operation. The author ventures to predict that after another quarter of a century, if not earlier, this statement will be measurably applicable to *paracentesis pericardii*.[1]

---

[1] *Vide* Treatise on Diseases of the Heart, 2d ed. page 124.

The circumstances under which paracentesis is indicated are, a quantity of liquid sufficient to involve immediate danger or occasion great distress; the liquid remaining undiminished by other measures of treatment, and the purulent character of the liquid.

As regards the operation, a small trocar should be used, and not Dieulafoy's needle. The movements of the heart against the point of the latter during the aspiration, might cause injury of the organ. The author's adaptation of a small canula to Davidson's syringe, aside from its simplicity, cheapness, and being always in order, has these advantages over Dieulafoy's instrument: the force of the aspiration can be easily graduated at will, and the aspiration is readily intermitted. It is desirable, as in the withdrawal of liquid from the pleural cavity, to aspirate slowly, with intermissions from time to time, in order to favor a gradual expansion of the lungs to fill the vacuum. As the heart is raised above its normal situation, leaving, below the organ, a space filled by liquid alone, the puncture should be made in a situation corresponding to this space. Adopting Sibson's rule, if the heart be not enlarged, the point for the puncture is "just above the upper edge of the sixth cartilage, at the lowest part of its curve, more than an inch within the mammary line." The direction given to the instrument should be slightly inward and downward, so that it may penetrate the collection of liquid below the heart. If, however, the heart be enlarged so that it may be felt beating in the fifth or sixth intercostal space, notwithstanding the accumulation of liquid, another point for the operation must be selected. "The lower border of the fully distended pericardium is usually a little above and sometimes even below, the lower end of the ensiform cartilage, and the pericardium may therefore be safely punctured through a point corresponding to the middle or the lower portion of that cartilage. The presence or absence of the impulse of the right ventricle in the epigastric space, and the position of the lower border of the pericardial dulness in that space, must be previously ascertained. Those two important points of diagnosis, which can be readily made, will prove a safe guide as to the place to be selected for the operation which should be sufficiently below the seat of the impulse to avoid the heart, and sufficiently above the lower border of pericardial dulness to prevent the canula from being tilted upward when the floor of the pericardium elevates itself as the sac is being emptied.[2]"

The treatment, in addition to that having direct reference to the removal of liquid from the pericardial sac, has for its objects support and invigoration. These objects call for a nutritious alimentation and tonic remedies. Exercise and mental excitement sufficient to increase the action of the heart are to be avoided.

---

[1] For an analysis of 41 cases in which this operation was employed, *vide* article by Dr. John B. Roberts, in the New York Med. Journal, Dec. 1876. It will now be practicable to collect a much larger number of cases. Since this note was written, Prof. William Pepper has reported a successful case, and three other cases are to be added to the foregoing, making 44 cases. Four cases have been reported in this country. Of the 44 cases on record, 20 may be regarded as successful. *Vide* Clinical Lecture by Prof. Pepper in the Medical News and Library, March, 1878.

[2] *Vide* Reynolds's System of Medicine, vol. iv. Am. ed. 1877, page 437.

If the liquid withdrawn from the pericardial sac be purulent, and it continue to reaccumulate after two or more aspirations, it is probably judicious to make a permanent opening, and employ daily injections as in cases of empyæma.

Pneumo-pericarditis.—The presence of air or gas, and a liquid—blood, serum, or pus—within the pericardial sac, gives rise to a loud splashing sound which may have a metallic, ringing quality. The sound is striking and characteristic. Percussion over the præcordia may yield a tympanitic resonance which is to be distinguished from that conducted from the stomach. In the interpretation of this resonance, also, pneumo-thorax and pulmonary cavities are to be excluded.

Hydro-pericardium.—The signs which denote a dropsical effusion into the pericardial sac are the same as when the liquid is due to pericarditis. Of course, a pericardial friction murmur is wanting. Dropsy of the pericardium occurs in cases of general dropsy, but the quantity of liquid is very rarely large. The treatment is that indicated by the general dropsy. Probably most of the cases in which hydropericardium has been considered as existing without general dropsy, were cases of subacute or chronic pericarditis. The author has never met with an instance of a purely dropsical effusion limited to the pericardium.

ENDOCARDITIS.

In the great majority of cases, endocarditis is associated with acute articular rheumatism, generally occurring after, but sometimes prior to, the arthritic manifestations of that disease. It is associated with chorea in a certain proportion of cases. It is a rare intercurrent affection in the eruptive fevers, in typhus and typhoid fever, in pyæmia, in septicæmia, and in the renal affections embraced under the name Bright's disease. It may be developed from time to time in the progress of valvular lesions of the heart. As a purely idiopathic affection it occurs so infrequently, is so likely to be overlooked, and moreover the difficulty of its recognition is so great, that we have little knowledge of it otherwise than as a secondary affection.

Endocarditis may be acute, subacute, and chronic Clinically it is impossible to make these distinctions with precision. In consequence of associated diseases, it is rarely possible to decide whether the endocardial inflammation be acute or chronic; and inasmuch as the diagnosis rests mainly on physical signs representing conditions which follow, as well as those which accompany, the endocarditis, it cannot be positively determined whether the latter has ended or whether it still continues. There is therefore no practical advantage in considering, formally, acute, subacute, and chronic endocarditis under separate headings. An important variety of the affection, however, generally known as ulcerative endocarditis, claims distinct notice.

The development of endocarditis in a case of acute articular rheumatism is to be suspected if the temperature rises one or two degrees without any new manifestation in the joints, or the occurrence of any other intercurrent affection which will account for the increase of fever. The existence of endocardial inflammation is probable if, in addition, the frequency of the pulse be increased; if the heart's impulse show an excited action amounting perhaps, to palpitation, and if the patient complain of obscure pain, together with a sense of oppression, referred to the præcordia. These symptoms are often not marked, and they may be wanting. They are never sufficient for a positive diagnosis, and, hence, the affection is overlooked by those who trust to symptoms alone. The requirement for a positive diagnosis is the presence of an endocardial murmur which it is known did not previously exist. In order for the diagnosis to be positive, therefore, auscultation must have been practised prior to the development of the endocarditis. If, when a patient with acute articular rheumatism is seen for the first time, an endocardial murmur be found, the absence of the murmur prior to the rheumatic attack not being known, the evidence of endocarditis is not complete, because the murmur may be due to lesions which existed previously. If the physical signs and the history show that the patient had valvular lesions with enlargement of the heart prior to the rheumatism, nothing can be inferred from a murmur as to existing endocarditis; but the presence of a murmur without enlargement of the heart, taken in connection with the symptoms which have been mentioned, renders the diagnosis of endocarditis probable, especially in a first attack of rheumatism.

All endocardial murmurs are by no means alike indicative of endocarditis. The murmur which is chiefly diagnostic is the mitral systolic murmur. The aortic direct murmur is far less diagnostic owing to the fact that this murmur, in cases of rheumatism, is often inorganic or hæmic. In women with acute articular rheumatism, an inorganic murmur at the base of the heart is the rule. It is more constantly referable to the pulmonic than to the aortic orifice. The pulmonic and the aortic direct murmur are often both present. While, therefore, local changes affecting the aortic valves in cases of endocarditis may give rise to an aortic direct murmur, this murmur, existing alone, is never to be relied upon for the diagnosis. On the other hand, the endocardial inflammation affecting especially that portion of the membrane which invests the mitral curtains, and a mitral murmur being rarely, if ever, inorganic, this murmur, if developed under observation, is proof of endocarditis. The other organic murmurs emanating from the left side of the heart, namely, the mitral direct or presystolic and the aortic regurgitant, represent lesions which are not the immediate, although often the remote, consequences of endocarditis. The inflammation being generally limited to the endocardial membrane within the left side of the heart, it follows that, of the four organic murmurs referable to this side, the mitral systolic is *par excellence* the sign of endocarditis. This murmur, as a sign of endocarditis, is not, strictly speaking, a mitral regurgitant murmur, for it is not probable that mitral regurgitation is an immediate, although a remote, effect. The murmur is produced within the ventricle; it is an intraventricular or mitral systolic non-regurgitant murmur. It is consistent with this statement that the murmur is heard at the apex and within the superficial cardiac space, and is rarely transmitted to the left of the præcordial region, or heard on the posterior aspect of the chest.

According to Sibson, a tricuspid regurgitant murmur is present in about one-half the cases of endocarditis. This murmur denotes, not endocardial inflammation within the right side of the heart, but over-distension of the right ventricle as a consequence of enfeebled action of the left ventricle, and a consequent regurgitant current, exemplifying the safety valve function at the tricuspid orifice. Coexisting with a mitral systolic murmur, it is doubtless often confounded with the latter.

Owing to the enfeebled action of the left ventricle as an immediate effect of endocarditis, and increased power of the right ventricle arising from the influx of an increased quantity of blood, the aortic second sound is weakened and the pulmonic second sound is intensified (*vide* page 172). The latter, however, can only take place when the quantity of blood within the right ventricle is sufficient to increase the power of the ventricular contraction, but not to weaken it by over-distension.

The diagnosis of endocarditis in cases of the eruptive and continued fevers, pyæmia, septicæmia, chorea, and Bright's disease, involves precisely the same points as in cases of acute rheumatism. In all, either with or without the local and general symptoms which render the existence of the affection probable, a mitral systolic murmur must be developed after the beginning of the primary disease, in order for the diagnosis to be positive. This requirement is not available when endocardial inflammation occurs in connection with cardiac lesions which have existed for a greater or less period. Under these circumstances endocardial murmurs have little or no significance as regards the diagnosis of endocarditis. The diagnosis must be based on the general and local symptoms which render it probable but not positive.

Certain occasional effects of endocarditis manifested elsewhere than in the heart, will serve to corroborate the diagnosis. The effects referred to are those caused by emboli derived from the heart-cavities. Embolism is a subject which will recur in various connections. It has entered into the consideration of pneumonia and pyæmia. Recently exuded or deposited fibrin, in cases of endocarditis, may form emboli which produce obstruction of vessels and infarctions in different organs. The endocardial inflammation, in the great majority of cases, being limited to the left side of the heart, the emboli are generally lodged in arteries belonging to the larger or systemic circulation, and especially those of the brain, spleen, and kidneys. Pulmonary embolism occurs only when the endocarditis affects the right as well as the left side of the heart, or when coagulation of fibrin is a consequence of over-distension of the right ventricle and auricle. The author has met with an instance in which the latter occurred in a case of acute rheumatism, giving rise to embolism of the pulmonary artery and causing sudden death. Embolism of the coronary arteries is an occasional event which may cause death by arresting the supply of blood to the muscular structure of the heart. Reference is here had to emboli which occasion effects solely due to the mechanical obstruction of arteries. Other effects, superadded to these, characterize embolism in cases of the so-called ulcerative endocarditis which will be considered presently under a separate heading. In ordinary, simple endocarditis, the occurrence of embolism producing appreciable pathological effects is rare. It is more frequent in cases of valvular lesions of the heart which may have been the sequels of endocardial inflammation, and the subject will recur in that connection.

Treatment.—A rational indication for treatment in cases of rheumatic endocarditis, as of pericarditis, is derived from an etiological fact which, although not demonstrated, appears to be logically established, namely, that the affection is caused by the presence in the blood of a materies morbi which may be neutralized by the introduction of alkalies. Following this indication, the carbonate of soda, or potassa, should be given in sufficient doses to maintain alkalinity of the urine. So also, in endocarditis, as well as pericarditis, associated with Bright's disease, the causation is considered as involving the morbid action of urinary constituents retained in the blood. With our present knowledge these cannot be neutralized, and elimination is the alternative. To eliminate urea or its products through the intestinal canal, or the skin, if not practicable by the kidneys, is, therefore, to follow a rational indication, the object being, as in rheumatic endocarditis, to prevent the continued action of the cause on the inflamed membrane. Our knowledge of the etiology, when the affection occurs in other pathological connections, is insufficient to furnish analogous indications for treatment.

Exclusive of the foregoing indications, the chief object of treatment is to secure, as far as possible, the valves against overstrain, by enjoining upon the patient strict quietude, by advising an unstimulating diet, and by the use of cardiac sedatives (digitalis, aconite, gelsemium), to allay over-excitation of the heart. Some benefit may be derived from the application of chloroform liniment or belladonna to the præcordial region.

Clinical experience shows that the alkaline treatment of acute rheumatism is to a certain extent prophylactic as regards endo- and pericarditis. Salicin and the salicylic acid are also prophylactic, in so far as they are successful in arresting acute rheumatism or shortening its duration. It is reasonable to suppose that the timely elimination of urinary constituents from the blood in cases of Bright's disease, may prevent the development of peri- and endocarditis.

ULCERATIVE ENDOCARDITIS.

Within the past few years attention has been directed to a variety of endocarditis distinguished from the ordinary form (vegetative, verrucose or warty endocarditis) by important peculiarities which claim for it distinct notice. The term ulcerative is usually employed to denote this variety. Other names are diphtheritic, septicæmic, and malignant endocarditis. The peculiarities depend on ulcerations furnishing morbid products and the detritus of tissue, which are carried into the circulation. These embolic matters may not only occasion mechanical obstruction of the arteries of organs in which their course is arrested, but they have septic properties which infect the blood, and excite local suppurative inflammation in the parts with which they are brought into contact. On the surface of the endocardial ulcers, skilled microscopists, including

Virchow, have found living organisms ("colonies of micrococci"). The septic properties of the matters derived from the ulcers are supposed to depend on these parasitical productions.

From differences pertaining to the clinical history, late writers recognize two types, namely, the typhoid and the pyæmic. The name given to the first of these two types, owes its significance to the fact that, from certain resemblances, it is liable to be confounded with typhoid fever. The symptoms are essentially those of septicæmia. The pyæmic type has the essential characteristics of pyæmia. Owing to the fact that the endocardial ulcerations are generally seated in the left side of the heart, the primary embolic inflammations, as a rule, are in organs to which emboli, starting on their migrations at the aorta, are most likely to be arrested, especially the spleen and the kidneys. Thence, secondary emboli may be derived, and find lodgment in the lungs. Moreover, as exceptions to the rule, endocardial ulcerations may exist in the right side of the heart, and then the lungs will be primarily the seat of embolic inflammations.

The causal connection of the cardiac affection with the septicæmia is to be determined by the proof afforded by physical signs of endocarditis at the commencement. In the pyæmic type, to determine its cardiac source there must be evidence that the endocarditis preceded local affections which are likely to give rise to pyæmia. Endocarditis is an effect of pyæmia in some instances, and hence, an endocardial affection which is secondary may be considered as having caused the pyæmic disease.

The proof of the endocarditis is the same as in the ordinary or benign form, namely, the development of an endocardial murmur referable especially to the mitral orifice, the fact of its not having previously existed being known. There is nothing at first which is distinctive of a murmur caused by the ulcerative variety of endocarditis. It is stated, however, that murmurs which denote aortic or mitral insufficiency sometimes follow so quickly as to constitute evidence that damage to the valves has taken place too rapidly to be explained otherwise than by the supposition of ulcerative processes.

The prognosis in the two types is the same as in cases of septicæmia and pyæmia, or, embracing both under the name septico-pyæmia, produced by infection derived elsewhere than from an endocardial affection; a fatal termination is the rule. The treatment, also, is the same, with the addition of the measures which are indicated in simple or ordinary endocarditis. Happily the ulcerative variety is rare.

III.

STRUCTURAL AFFECTIONS OF THE HEART.

VALVULAR LESIONS, CARDIAC THROMBOSIS OR HEART-CLOT, LESIONS OF THE WALLS OF THE HEART, HYPERTROPHY AND DILATATION, FATTY DEGENERATION OF THE HEART, CYANOSIS FROM CONGENITAL MALFORMATION OF THE HEART, ANGINA PECTORIS.

The term structural, as here used, will embrace visible lesions which are permanent, that is, not admitting of the complete restoration of the normal structure. They are conveniently arranged into two groups, to wit, lesions of the valves and orifices, known as valvular lesions, and lesions of the walls of the heart.

VALVULAR LESIONS.

The diagnosis of the structural affections of the valves and orifices of the heart, comprises more than the simple fact that lesions exist. The localization of the lesions is an important part of the diagnosis. Of the two auriculo-ventricular and the two ventriculo-arterial orifices, either one, two, three, or all four may be the seat of lesions, not only in different cases but in the same case. It is generally practicable to determine whether lesions do, or do not, exist at one, or more, or all of the different orifices. The several situations of valvular lesions may be specified by the terms mitral, aortic, tricuspid, and pulmonic. Having determined the existence of lesions, the next object, in individual cases, is to localize them. Another object is to determine the character of the lesions. They may be of a character to produce obstruction, the valves remaining intact, or the valves may be affected and rendered incompetent without obstruction, or, again, obstruction and incompetency may be conjoined. Incompetency of the valves occasions a backward blood-current, or regurgitation, and lesions which involve this effect may be distinguished as regurgitant, in contradistinction from obstructive, lesions. It is generally practicable to determine whether existing lesions are obstructive or regurgitant, and whether both exist in combination. The gravity of lesions is a most important point of inquiry to be considered in connection with the diagnosis. Lesions which involve neither obstruction nor regurgitation, are, for the time at least, innocuous. To determine this fact is highly desirable, and is generally practicable. The lesions may occasion different degrees of obstruction and regurgitation, their gravity, other things being equal, corresponding to the degree of either or both. The means of diagnosis which are now available, enable the practitioner to judge of the gravity of obstructive and regurgitant lesions.

The fact that valvular lesions, in the vast majority of cases, are seated in the left side of the heart, is to be borne in mind with reference to diagnosis. It should also be borne in mind that lesions at the tricuspid and the pulmonic orifice do occur. The latter are sometimes not localized, because, as a matter of course, it is supposed that lesions are seated either at the mitral or the aortic orifice; or, lesions at one or both of the latter orifices having been determined, coexisting lesions in the right side of the heart are overlooked. Another fact is to be borne in mind, namely, tricuspid and pulmonic lesions, especially if unaccompanied by lesions in the left side of the heart, are generally congenital; hence, they are found, as a rule, in early life.

The diagnosis of valvular lesions, comprehending the foregoing objects, is to be based mainly on the endocardial murmurs described among the observations preliminary to this section (*vide* page 173 *et seq.*). A practical acquaintance with the differential characters of these murmurs is essential in order to be able to localize lesions, determine their character, and decide respecting their gravity. Diagnostic symptoms, however, are by no means unimportant. These are to be considered in conjunction with the auscultatory signs.

The Diagnosis of Mitral Lesions.—Of valvular lesions, the most frequent are those which render the mitral valve more or less incompetent, permitting regurgitation from the ventricle into the auricle. The mitral regurgitant murmur represents this effect of mitral lesions. Mitral regurgitation rarely occurs without the murmur. When the murmur is wanting, its absence is due to diminished power of the left ventricle. It may be wanting when the patient is at rest, and discoverable if the action of the heart be excited; hence, before deciding, from absence of the murmur, that there is not mitral insufficiency, it is a good precaution to excite the action of the heart by causing the patient to make some exertion, such as walking as rapidly as convenient for a few moments, provided, of course, the strength warrants this procedure. The murmur may be present at some times and absent at other times, owing to a difference in the force of the heart's action. If the murmur be not too feeble, it is heard to the left of the apex of the heart, and often on the back near the lower angle of the scapula.

The distinction between a mitral regurgitant murmur and a mitral systolic murmur which is non-regurgitant, or intra-ventricular, is to be borne in mind (*vide* page 173). The latter occurs in endocarditis (*vide* page 208), and in connection with mitral lesions which do not cause incompetency. It may be produced by an impulsive movement of the apex against adjacent lung, and, possibly, may sometimes be of hæmic origin, that is, inorganic.

The mitral, direct or presystolic murmur (*vide* page 173), is the sign of obstructive lesions. This murmur is less infrequent than has been supposed, it having been often mistaken for a mitral regurgitant murmur. The two murmurs can never be confounded if the distinctive characters of each be clearly apprehended. The presystolic murmur is not always present in cases of mitral obstructive lesions. If present with its usual characters, it denotes obstruction caused by an adhesion to each other of the mitral curtains at their sides, leaving a contracted aperture which has been called the button-hole contraction. According to the author's explanation of its mechanism, the murmur is produced by a vibration of the mitral curtains; hence, it may be wanting if the curtains are too rigid to vibrate. It may disappear, either temporarily or permanently, in the progress of disease, the left auricle from dilatation contracting too feebly to produce it. Its disappearance under these circumstances, of course, is not favorable but otherwise. The author has observed its disappearance in connection with notable increase of dyspnœa and the occurrence of general dropsy. This murmur may occur without mitral lesions in cases of free aortic regurgitation (*vide* note page 174).

A mitral regurgitant and a mitral direct murmur are not infrequently conjoined, showing the coexistence of mitral obstructive and regurgitant lesions.

No inference respecting the degree of obstruction or of regurgitation, or of both combined, can be drawn from the murmurs. The statement that the intensity and other characters furnish no criteria for judging of the gravity of the valvular lesions, applies to all the murmurs. A judgment concerning the amount of regurgitation, or of obstruction, or of both, may be based on weakness of the aortic second sound of the heart (*vide* page 172).

Symptoms diagnostic of mitral obstructive and regurgitant lesions, are dyspnœa or orthopnœa dependent on impeded pulmonary circulation, general dropsy, and cyanosis. These symptoms, however, are rarely present in a marked degree prior to enlargement of the heart by dilatation. Enlargement of the heart, either limited to, or predominating in, the right ventricle, if not dependent on emphysema or some other pulmonary affection involving obstruction to the circulation through the lungs, and provided there are no lesions at the pulmonic orifice, is evidence of mitral lesions causing obstruction or regurgitation, or both combined.

The pulse is small in proportion to the amount of obstruction and the quantity of blood which regurgitates. After dilatation of the heart has taken place, the pulse is often weak, irregular, unequal; and more or less of the systolic contractions of the left ventricle may fail to produce an appreciable radial pulsation. The extremities show a deficient supply of arterial blood. Gangrene is an occasional effect. The author has known gangrene of the toes and the end of the nose to occur, dependent, apparently, on the inability of the heart to supply these remote parts with blood sufficient for nutrition.[1]

The Diagnosis of Aortic Lesions.—The blood which regurgitates from the aorta into the left ventricle when lesions exist which render the valve incompetent, gives rise to the aortic regurgitant murmur (*vide* page 174). This murmur is rarely wanting if regurgitation take place, so that regurgitant lesions may with much confidence be excluded by the absence of the murmur. The murmur has no significance beyond that of aortic regurgitation and its presence is positive proof of valvular incompetency. The amount of insufficiency and consequent gravity of the lesions cannot be predicated on the intensity or other characters of the murmur. A judgment concerning this important point may be formed by comparing the aortic with the pulmonic second sound. The comparative weakness of the aortic second sound is proportionate to the damage to the valve, and the quantity of blood which regurgitates.

---

[1] A case of spontaneous gangrene of both feet in a boy, arising from disease of the heart, double amputation being performed with recovery from the operations, and death from cardiac and pulmonary conditions, is reported by F. J. Gant, in Trans. Clinical Society of London, vol. v. 1876.

In most cases the lesions which cause incompetency of the valve, give rise to an aortic direct murmur (*vide* page 174). The two murmurs are then present. Incompetency, however, does not always involve the conditions for the aortic direct murmur, and the latter is not infrequently present without regurgitation. The aortic direct murmur is caused by obstructive lesions; but it may, also, depend on conditions which do not involve any appreciable obstruction. The lesions in the latter case are, for the time at least, innocuous. The importance of this distinction is obvious. The characters of the murmurs do not afford information in regard to it. Whether the lesions are, or are not, obstructive, and, if the latter, the degree of obstruction, are to be determined by the effects upon the heart and the symptoms. The aortic second sound, as a criterion of the fact of obstruction or of its degree, is not available; there may be notable obstruction without appreciable weakening of this sound, provided the valvular segments are not damaged. An aortic direct murmur dependent on lesions, is to be distinguished from a murmur, which is inorganic, that is, dependent on blood-changes (*vide* page 175).

The diagnostic symptoms, in cases of aortic lesions, are, at first, palpitation and the consciousness of an increased impulse of the heart. After a time the patient suffers from a sense of præcordial oppression. With free regurgitation and dilatation of the heart, paroxysms are liable to occur in which this sense of oppression is distressing and accompanied by a feeling of impending death. Under these circumstances death not infrequently takes place suddenly. Notable dyspnœa, cyanosis, and dropsy occur only at an advanced period, and a fatal termination often is not preceded by these symptoms.

The pulse is small in proportion to the amount of obstruction. It is less frequently irregular and unequal than in cases of mitral lesions. Free aortic regurgitation is represented by characters of the pulse which are quite distinctive; it is notably quick or jerking, and visible movements of arteries near the surface are conspicuous (*vide* page 170).

The Diagnosis of Tricuspid Lesions.—Tricuspid regurgitation is frequent without tricuspid lesions. Regurgitation through this orifice takes place whenever the right ventricle is much distended with blood, constituting what has been called the safety-valve function. It probably always occurs when dilatation of the right side of the heart has taken place, and it is therefore present in cases of mitral lesions when these have led to that result. But tricuspid regurgitation takes place not infrequently without a tricuspid regurgitant murmur, making due allowance for the instances in which this murmur is confounded with the mitral regurgitant. The absence of murmur although regurgitation takes place, is shown by the fact that the murmur is wanting when a ventricular venous pulse in the neck is apparent. A tricuspid regurgitant murmur, however, is often present under these circumstances. To determine whether the murmur represents a regurgitant current purely from dilatation of the right ventricle, assuming the heart to be enlarged, or from lesions of the tricuspid valve, is impossible. The great infrequency of these lesions, especially if those which are congenital be excluded, renders their existence improbable, notwithstanding the murmur, if there be enlargement of the heart. Free tricuspid regurgitation, especially if the right ventricle be hypertrophied, may give rise to an impulse over the liver, which may be seen and felt (hepatic pulsation). Tricuspid obstructive lesions are so rare as to belong among the curiosties of clinical experience. A few cases in which a tricuspid direct murmur existed have been reported.

General dropsy and cyanosis are effects of tricuspid regurgitant and obstructive lesions, these effects taking place earlier than in cases of mitral lesions, and not necessarily connected with enlargement of the right ventricle, the latter being a requirement when these effects are dependent on mitral lesions.

The Diagnosis of Pulmonic Lesions.—A pulmonic direct murmur, if it be organic, represents lesions at the pulmonic orifice. This murmur is to be distinguished from the aortic direct murmur. An inorganic pulmonic direct murmur is of frequent occurrence. The organic murmur is rare in consequence of the infrequency of lesions in this situation. As the lesions are generally congenital, the fact of the patient being in infancy or childhood is a point to be considered in the diagnosis.

Incompetency of the pulmonic valve is to be inferred from the presence of a diastolic murmur which, by means of the associated circumstances, may be distinguished from the aortic regurgitant. The associated circumstances are, the presence of a pulmonic direct murmur, weakness of the pulmonic second sound, absence of the characters of the pulse distinctive of aortic regurgitation, together with evidence that the lesion is congenital afforded by the age of the patient, and by the existence of cyanosis at birth or developed shortly afterward.

The symptomatic effects of pulmonic are the same as those of tricuspid lesions. The effects are produced more tardily by the former, dilatation of the right ventricle being an intervening factor when they are produced by the latter.

Emboli are not infrequently derived from the heart in cases of valvular lesions. Warty growths or vegetations, and masses of coagulated lymph are liable to become detached and carried into the arterial circulation; they become lodged at points where the calibre of the vessel is too small to admit of their further progress. Hence arise obstruction sometimes of large arteries, infarctions of the spleen and kidneys, and occlusion of the cerebral vessels.

Hemiplegia of the right side, following perhaps an apoplectic seizure and accompanied by aphasia, lead in some cases to the discovery of valvular lesions, the existence of which had not been suspected. The presence of endocardial murmur or murmurs, is to be taken into account in determining that the cerebral affections just named are attributable to embolism.

Treatment of Valvular Lesions.

Valvular lesions, prior to the supervention of enlargement of the heart, rarely give rise to symptoms pointing to cardiac disease. If they do not lead to the production of emboli which occasion obstruction in situations where the embolic character of the local affection is recognizable, they remain undiscovered until auscultation is practised, as a matter of course, in some acute disease, or, perhaps, in a person supposed to be healthy for the purpose of studying the normal heart-sounds. It is vastly important to recognize the fact that lesions giving rise to murmurs may be innocuous, remaining so indefinitely, and perhaps never causing serious effects. The author can cite instances within his own experience in which a mitral regurgitant murmur has existed for twenty and thirty years in persons now living and free from any symptoms of cardiac disease. In a person of active habits enjoying perfect health, an aortic regurgitant murmur existed nearly twenty years ago. A patient who presented ten years ago a loud mitral direct murmur, and who has during this period been under observation, suffers at the present time small inconvenience, and the heart is but little enlarged. In several instances mitral obstructive lesions have been well tolerated for a period exceeding that just named. It is a common error to attach undue immediate importance to valvular lesions. In order to avoid this error, the following rule should be borne in mind: valvular lesions in general are not followed by grave consequences until they have occasioned dilatation of the heart.

The treatment in cases of valvular lesions unaccompanied by enlargement of the heart, embraces only precautionary measures. The object is to prevent progress of the lesions and damage of the valves. The heart should be secured, as far as possible, from unnecessary strain. Violent muscular exertions and mental excitement are to be avoided. Measures for this object may be carried too far. It is an unfortunate mistake to enjoin over-quietude, in consequence of which the general health may suffer, and the patient be needlessly debarred from occupations which are sanitary in respect to mind as well as body. It is undesirable for the attention to be too closely directed to the heart. Exercise which does not excite the action of the heart need not be interdicted. It is improper to intimate a liability to sudden death. The diet should be ample, but excesses in eating are to be guarded against; good blood and nutrition are important. Alcoholics should be taken very moderately if at all. In short, so far from from its being useful to reduce the powers of the system, hygienic treatment should have reference to the maintenance of the general health.

The seat and character of valvular lesions furnish important indications when accompanied by enlargement of the heart. These will be noticed in connection with the treatment of the latter.

CARDIAC THROMBOSIS OR HEART-CLOT.

In connection with valvular lesions may be appropriately noticed the coagulation of fibrin within the heart cavities (thrombosis), forming a clot which from its size occasions more or less obstruction, but which more especially obstructs the direct current of blood by its attachment to the auriculo-ventricular valves and becoming intertwined with the tendinous cords. This variety of thrombosis is to be distinguished from the formation of thrombi of comparatively small size, which occur in connection with endocarditis and valvular lesions, and which are apt to become detached and give rise to embolism in different situations. In the cases of heart-clot now referred to, the pathological effects relate to the circulation through the cardiac orifices and cavities. In *post-mortem* examinations the clots which are formed after death are to be distinguished from those which are *ante-mortem*; and, of the latter, those produced during the last moments of life are to be distinguished from those which preceded the moribund state and occasioned death. For the points involved in these distinctions, the reader is referred to works on morbid anatomy or on diseases of the heart.

The formation of heart-clot is the cause of death in certain cases of various diseases, but in cases of acute pneumonia or pneumonic fever oftener than in those of any other affection. It is an occasional event in diphtheria, acute articular rheumatism, the eruptive fevers, etc. The author has lately seen a case of scarlet fever characterized by intense pyrexia, in which a heart-clot proved the cause of death after the fever had been apparently brought to a favorable termination. The fact that in these cases the clot is formed in the right side of the heart, thereby causing congestion of the systemic venous system, explains certain symptoms and especially cyanosis.

A heart-clot may be inferred from the occurrence suddenly, or within the space of a few hours, of notable weakness and smallness of the pulse, which is generally frequent and sometimes irregular, these characters representing a deficient supply of blood to the left ventricle; venous congestion which may occasion marked lividity of the prolabia (cyanosis); a distressing sense of oppression which the patient refers to the præcordia—these symptoms not being explicable by any newly-developed conditions pertaining to the lungs. Assuming the absence of previously existing valvular lesions, an endocardial murmur developed in connection with the foregoing symptoms, and referable to the right side of the heart, is a significant sign which, however, may not be present. The restrained movements of the tricuspid valves may impair appreciably the valvular element of the first sound of the heart, especially at the right boundary of the præcordial region. The aortic second sound is weakened by the deficient supply of blood to the left ventricle.

The symptoms which point to heart-clot may be caused by over-distension of the right side of the heart without the coagulation of fibrin. The former, doubtless, in most cases precedes, and is the most important factor in producing, the latter. The differential diagnosis can only be made with positiveness when to the symptoms are added the physical signs just mentioned.

A heart-clot of sufficient size to be accompanied by the symptoms which have been stated, proves fatal in the great majority of cases. It may possibly be removed by liquefaction and molecular disintegration. The author has met with a case in which this seemed a fair conclusion from the facts of the history, complete recovery taking place. If death be not an immediate effect, detachment of fragments of the clot and subsequent pulmonary embolism are likely to occur.

If a clot have formed, the indications for treatment relate to the maintenance of the heart's action; the object is to "obviate the tendency to death" by the use of alcoholics and alimentation. Dr. B. W. Richardson is of the opinion that "the persistent administration of ammonia until the whole volume of blood is under the influence of the alkali," may be useful, the remedy acting as a solvent. Absolute rest in the horizontal position is to be enforced. Opium is to be avoided. Inasmuch as a fatal result is to be expected, the prophylaxis is more important than the therapeusis. In cases of pneumonia, more especially, the treatment should have reference to the danger of over-accumulation of blood in the right side of the heart. The symptoms which betoken this danger should be heeded in other acute diseases. Clinical experience appears to show that diminishing the intensity of the fever diminishes the danger, in this direction, in cases of pneumonia.

Death is sometimes caused by heart-clot in cases of valvular lesions accompanied by dilatation of the heart. The clot may form in the left side of the heart in cases of aortic lesions which have led to dilatation of the left ventricle. Under these circumstances, however, a diagnosis cannot be made with any degree of positiveness.

Lesions of the Walls of the Heart.

Certain structural affections seated in the substance of the heart cannot be diagnosticated, and therefore do not claim consideration in this work. These affections are fibroid degeneration, atrophy, circumscribed dilatations or aneurisms, morbid growths or tumors, calcifications, cysts, and parasitical productions. Happily they are extremely rare. Rupture of the heart belongs in this category. When rupture has taken place, there is seldom time to venture upon an *ante-mortem* diagnosis. Prior to the *post-mortem* examination, it can only be conjectured that this is the cause of sudden death. A conjecture is to be based on intense præcordial pain accompanying symptoms of syncope, and knowledge of the existence of fatty degeneration of the heart. Eliminating the foregoing affections, those which remain are hypertrophy, dilatation, fatty degeneration, and malformations as giving rise to congenital cyanosis.

Hypertrophy and Dilatation of the Heart.

It is unnecessary here to inquire whether concentric hypertrophy, that is, hypertrophy with diminution of the size of the cavities, ever exists; for, if it ever occur, it cannot be diagnosticated. Simple hypertrophy, that is, a morbid increase of the muscular substance without dilatation, undoubtedly occurs. The same may be said of simple dilatation, that is, a morbid increase of the volume of the heart from enlargement of its cavities without increased thickness of the muscular walls. As a rule, when the heart is enlarged sufficiently to possess much clinical importance, the enlargement is due to hypertrophy and to dilatation combined, and it answers all the practical ends of diagnosis and treatment to consider enlargement of the heart as involving a predominance of either hypertrophy or dilatation. In practice it is important to distinguish between enlargement with predominant hypertrophy and enlargement with predominant dilatation.

The diagnosis, in cases of enlargement of the heart, is not complete when the amount of enlargement has been ascertained and the predominance of either hypertrophy or dilatation. In a very large proportion of cases the enlargement is a result of valvular lesions. It is important to determine whether the enlargement be, or be not, associated with these lesions. Moreover, in cases of enlargement, it is very rare for all portions of the heart to be equally enlarged; the enlargement predominates in, and it may be limited to, the right or the left side of the heart. The right side and the left auricle are often much enlarged with little or no enlargement of the left ventricle. The localization of the associated valvular lesions explains these variations. Of the two ventricles, the right or the left is predominantly enlarged according to the situation of lesions in the left side of the heart at either the mitral or the aortic orifice. The relations of hypertrophy or dilatation to the valvular lesions, not only enter into the diagnosis in its comprehensive sense, but they are to be considered with reference to treatment.

Diagnosis of Enlargement of the Heart.—Enlargement and its degree can be determined only by means of physical signs. The apex beat, that is, the lowest point of impulse, is below its normal situation, namely, the fifth intercostal space, and is removed more or less to the left of the linea mammalis. It may be felt in the sixth, seventh, eighth, or ninth intercostal space, the extent to which it is lowered being proportionate to the degree of the enlargement. If the heart be much enlarged, impulses are generally felt in the intercostal spaces above the situation of the apex beat. In some cases in which the heart is largely dilated, the apex beat cannot be felt. Its situation is then to be ascertained by finding the point at which the first sound of the heart is heard with its maximum of intensity.

The superficial cardiac space, that is, the space within which the heart is in contact with the walls of the chest, is increased in proportion as the heart is enlarged. An exception to this statement is where pulmonary emphysema coexists with cardiac enlargement. The space in health is represented by a right-angled triangle, the hypothenuse of which is a line drawn from the centre of the sternum on a level with the fourth costal cartilage to a point between the fifth and sixth ribs and a little within the linea mammalis (the normal situation of the apex beat). This space is increased if the volume of the upper lobe of the left lung be not enlarged by emphysema, in proportion to the degree of cardiac enlargement. The space may exceed twice or thrice the area of health. The extent of increase is readily determined by percussion, or by auscultation of the voice.

It is generally not difficult by forcible percussion to determine with exactness the space which the enlarged heart occupies. In proportion to the enlargement, the left border is extended beyond the linea mammalis; the right border extends somewhat, but not greatly, beyond the normal boundary of the præcordia on this side, namely, a finger's breadth to the right of the right margin of the sternum; the base of the heart remains in the normal situation, or nearly so, and the inferior boundary is lowered as determined by the situation of the apex beat.

It is evidence of enlargement predominating in the left side of the heart, assuming the organ to be considerably enlarged, when the apex is lowered without being greatly removed to the left of the linea mammalis.

If this variety of enlargement be secondary to valvular lesions, these are situated at the aortic orifice. On the other hand, it is evidence that the enlargement predominates in the right side of the heart when the apex is removed far to the left of the linea mammalis, being also more or less lowered, unless the deflection is aided by abnormal conditions within the abdomen. The right border of the heart extends further beyond the right normal boundary of the præcordia, when the enlargement predominates in the right, than when it predominates in the left, side of the organ. Enlargement of the right ventricle and auricle is secondary to valvular lesions at the mitral orifice, and, under these circumstances, the left auricle is dilated.

The association of enlargement with valvular lesions is determined by the presence of endocardial murmurs which have been stated (*vide* pages 173 and 213 *et seq.*). The enlargement will predominate less on either side, when valvular lesions occasioning obstruction, or regurgitation, are situated both at the mitral and aortic orifices. In the comparatively rare instances of lesions at the pulmonic and the tricuspid orifice, the enlargement predominates in, and may be limited to, the right side of the heart.

Enlargement not associated with valvular lesions is determined by the absence of endocardial murmur. With rare exceptions, valvular lesions are represented by murmurs, provided the action of the heart be not very greatly weakened. The absence of murmur is therefore, in general, sufficient for the exclusion of valvular lesions. When the enlargement is not secondary to valvular lesions, with the exception of the cases in which it is caused by pulmonary emphysema, the left ventricle is predominantly enlarged.

Differential Diagnosis of Hypertrophy and Dilatation.—The symptoms and signs of hypertrophy proceed from increased force of the heart's action, and, *per contra*, dilatation, in proportion as it predominates, weakens the action of the heart.

The increased force in hypertrophic enlargement is shown by abnormal strength of the impulses in the præcordia, and by a strong heaving movement, during the ventricular systole, when the hand is applied to the chest in that region. The amount of increased force may thus be appreciated by palpation. The first sound of the heart, on auscultation over the apex, is abnormally loud, long, and booming. These signs show that hypertrophy is the predominant form of enlargement. The patient is often conscious of an increased force of the heart's action, and the movements of the clothing, or even of the body, may be apparent to others. The pulse represents the increased force only when the hypertrophy is not associated with obstructive or regurgitant valvular lesions. If these be wanting the pulse is notably strong.

On the other hand, if, with considerable or great enlargement, the impulses within the præcordia are feeble; if with the hand applied over the præcordia a heaving movement be not perceived, and if the first sound over the apex be weak, short and valvular, dilatation predominates. The patient pants on exercise, or dyspnœa may be constant; and if the dilatation be great, there is orthopnœa. These symptoms belong especially to dilatation of the right side of the heart. Other symptomatic effects are—lividity of the prolabia and face, dilatation of the veins, especially of the neck, and general dropsy. The pulse is small and weak from insufficiency of the right ventricle to propel the blood through the pulmonary circuit. Dilatation of the left ventricle causes a sense of præcordial distress from the accumulation of blood in the ventricular cavity. This distress augments whenever the ability of the ventricle to expel blood is lessened by distension from an increase of the accumulation, and it may be accompanied by a sense of impending death. The accumulation may be sufficient to cause sudden death, producing paralysis from over-distension, or sometimes leading to the formation of heart-clot.

Treatment of Hypertrophy and Dilatation.

Hypertrophy is compensatory and conservative; to attempt, therefore, to diminish it by any direct measures is not an object of treatment. To prevent its increase by direct measures, if practicable, would not be desirable. The causative conditions being those which necessitate increased muscular work of the organ, the abnormal muscular growth is to be lessened or limited, indirectly, by measures which have reference to these conditions.

The greater part of the causative conditions of hypertrophy cannot be removed. Obstructive and regurgitant valvular lesions are the causes in a large proportion of cases. These causes must continue in operation. The same is true of other causes, namely, obstruction of the pulmonary circulation in cases of emphysema, aortic aneurism, atheroma of the arteries, and the impeded flow of blood through the capillaries in certain cases of Bright's disease. The conditions in a small proportion of cases may be lessened or controlled. This is true of prolonged violent muscular exertions, and the persistent frequency of the heart's action in cases of Graves's or Basedow's disease. In brief, it is an object of treatment to lessen or remove the causes of hypertrophy, if practicable, and if this be impracticable, the hypertrophy is not an evil but an advantage.

It is important for the patient to avoid all superadded causes of increased labor of the heart, namely, active exercise, mental excitement, alcoholic stimulation, and excesses in diet. It is equally important to secure ample assimilation, good nutrition, and general vigor by means of exercise which does not excite the action of the heart, occupation of mind, a nutritious diet, and, perhaps, the moderate use of wine.

Digitalis, aconite, and other cardiac sedatives are admissible and useful when there is functional disturbance of the heart, not dependent on the conditions which are causative of the hypertrophy.

The desirable end to be kept in view, in cases in which, from the necessary persistence of causative conditions, hypertrophy is conservative, is to prevent the predominance of dilatation, or, in other words, to maintain the predominance of hypertrophy, inasmuch as the evils and dangers incident to enlargement of the heart relate, not to hypertrophy, but to dilatation. As conducive to this end, the treatment, medicinal and hygienic, should tend to promote general health and vigor.

The objects of treatment, when dilatation has taken place, are to strengthen the heart, and thereby to retard progressive increase of the size of the cavities. Enlargement by dilatation is not conservative, but, on the contrary, if considerable or great, it is fraught with suffering and danger. It is to be antagonized as far as possible by measures of treatment. Attention to the processes of assimilation is of primary importance. The maxim that "a lame heart needs good blood," is especially pertinent in this connection. The diet should be nutritious. Defective appetite or imperfect digestion call for appropriate tonic remedies. Anæmia favors excited action of the heart, and lessens its power of resistance to the causes of dilatation. If it exist, it claims efficient treatment. While it is even more important to avoid causes producing excitation of the heart, than when hypertrophy predominates, moderate exercise which can be taken without a sense of discomfort is advisable.

Remedies which tend to strengthen the heart and regulate its action, are of much use. Of these, digitalis is pre-eminently useful. It is indicated especially when the heart's action is feeble, rapid, and irregular. It often increases the strength, diminishes the frequency and renders the action regular. The relief of dyspnœa and other symptoms consequent on these immediate effects is sometimes remarkable. Aortic obstructive or regurgitant lesions associated with dilatation of the left ventricle, do not contraindicate this remedy, but they should enjoin caution in its use so as not to lengthen too much the intervals between the ventricular systoles. Aconite is useful as a regulator of the heart's action in the same way as digitalis, although inferior to the latter. It may be substituted for digitalis if the latter occasion gastric disturbance. Nux vomica or strychnia have a tonic effect upon the heart. The tincture of the cactus grandiflora, in doses of from three to five minims, is a valuable heart tonic. Palliative treatment is indicated by dyspnœa. A source of great suffering is defective hæmatosis in cases of dilatation of the right ventricle, especially when associated with mitral obstructive or regurgitant lesions. Ethereal and alcoholic stimulants afford some relief. Opiates, given cautiously, may be resorted to. The most effectual remedy for the relief of dyspnœa in some cases is digitalis. A large number of dry cups to the chest sometimes relieves, probably by diminishing temporarily the quantity of blood in circulation.

The treatment of cardiac dropsy has been considered(*vide* page 188).

FATTY DEGENERATION OF THE HEART.

The lesion in fatty degeneration of the heart, or "fatty heart," is a substitution of fat for the muscular tissue. This affection is not to be confounded with an abnormal growth of adipose tissue or "obesity of the heart." In the latter affection the surface of the organ is more or less loaded with fat, which may extend between the muscular fibres causing atrophy by pressure. The two affections sometimes coexist, but either may be present without the other. Fatty growth never gives rise to the symptoms and pathological effects of extensive fatty degeneration. It cannot be diagnosticated with any approach to certainty. Unless attended with considerable atrophy of the muscular fibres, or the quantity of fat upon the heart be excessive, it is not only a latent, but an innocuous lesion. If considerable atrophy have been induced, or the heart be very heavily loaded, the symptoms are analagous to those of fatty degeneration. A differential diagnosis under these circumstances is impracticable.

Whenever it is a question which of the two affections is present, there is not much risk of error in concluding that the case is one of fatty degeneration.

The diagnostic symptoms and signs of fatty degeneration represent persistent weakness of the heart's action. The impulse of the heart is feeble or imperceptible. The pulse is soft or compressible. The veins of the neck are unduly filled, and there may be venous congestion apparent over the body, rarely, however, sufficiently to constitute cyanosis. A sense of the want of breath and panting on exercise are symptoms more or less marked. Syncope is liable to occur on any unusual exertion. The patient suffers from indefinite distress referable to the præcordia. Pains shooting from this region into the left upper extremity, having the characters of angina pectoris, are apt to occur.

The auscultatory signs relate to the first sound of the heart as heard over the apex. This sound is weak, short, valvular, and it may be wanting, although the second sound is heard over the apex. The characters of the first sound which are derived from the element of impulsion are absent. These abnormal modifications of the first sound are the same as in dilatation of the heart. They have no significance as pointing to fatty degeneration if the heart be dilated; the physical diagnosis, therefore, requires that the latter be excluded.

The exclusion of valvular lesions and enlargement of the heart is a requirement for a positive diagnosis of fatty degeneration. But the former may coexist with the latter. The diagnostic problem is then complicated, and positiveness is hardly attainable. A probable diagnosis, however, may be based on the insufficiency of the valvular lesions and enlargement to account for the symptoms without supposing the coexistence of fatty degeneration.

The symptoms and signs of fatty degeneration are present only when the degree and extent of the lesion are considerable. More or less of this degenerative change is often found after death when it has not been suspected during life. The author has reported a case of rupture of heart, incident to fatty degeneration, the patient accustomed to habits of active exercise and not complaining of any symptoms referable to the heart up to the occurrence of the rupture.[1] If the fatty change be limited, or, if diffused, but slight in degree, the diagnostic symptoms and signs may not be sufficiently distinct to point to any affection of the heart.

Certain symptoms not as yet mentioned have been supposed to have diagnostic significance. One of these is infrequency of the pulse. Cases have been reported in which the pulsations were reduced to 30, 20, 15, and even 9 or 10 per minute. It is possible, if not presumable, that in some of these cases the pulse did not accurately represent the number of ventricular contractions, certain of these being too weak to cause an appreciable pulsation of the radial artery. However that may be, notable infrequency of the pulse occurs but rarely in connection with fatty degeneration, and it occurs as a symptom of a purely functional disorder. Its occurrence with fatty heart probably denotes only an associated neuropathic affection.

Another symptom is the curious aberration of breathing known as the

---

[1] Treatise on Diseases of the Heart, 2d edition, page 122, 1870.

"Stokes respiration" (*vide* page 70). This is by no means distinctive of fatty heart. It is met with in cases of valvular lesions with enlargement, and in cases of Bright's disease without any cardiac complication. The author has observed this symptom in a case of cerebral exhaustion from which the patient recovered.

Paroxysms of a semi-comatose condition, or, as it has been termed, pseudo-apoplexy, have been observed in connection with fatty heart. Some examples have fallen under the author's observation. They are rare in this connection, and they occur independently of cardiac disease.

Finally, fatty degeneration of the cornea, forming the *arcus senilis*, has been thought to have significance from its frequent coincidence with fatty heart. It has very little value as a diagnostic symptom, inasmuch as it is common when there is no evidence of any cardiac disease, and is by no means a constant symptom when the heart is the seat of fatty degeneration.

Age is to be considered in the diagnosis. The affection is almost limited to middle or advanced life.

The objects of treatment are to arrest the progress, in degree and extent, of the degenerative change, to increase the muscular strength of the heart, and to palliate the symptomatic effects of the affection.

Luxurious habits as regards indolence and dietetic indulgences, together with the free use of alcoholics, are reckoned among the causes, and, hence, whenever they may be supposed to enter into the etiology, a reform in these respects is an important part of the treatment. But caution should be observed to avoid too abrupt and radical change in the habits of life. The diet should be ample and nutritious. Here as in other connections, the maxim "a lame heart needs good blood" is pertinent. It would be a great mistake to restrict the diet below the requirements for assimilation. Fat, sugar, and starch should enter as sparingly into the diet as is consistent with the wants of the system expressed by appetite. Exercise within the limit of comfort is important. Taken within this limit, that is, without uncomfortably exciting the action of the heart, or causing panting, it strengthens the muscular walls, and probably tends to prevent the progress of the affection. Alcoholics should be taken only to the extent of promoting digestion. Tonic remedies are indicated if the appetite or digestion be impaired.

The palliative remedies are those which regulate and increase the power of the heart's action. They are indicated by præcordial distress, dyspnœa and a tendency to syncope. Digitalis is sometimes of signal efficacy. Nux-vomica and strychnia are valuable remedies.

It is to be borne in mind that this affection, aside from the liability to rupture, involves danger of sudden death from repletion of the heart-cavities and consequent paralysis of the muscular walls. With reference to the danger both of rupture and paralysis from over-distension, the physician should enjoin care to avoid muscular exertions and mental excitement which overtask or strain the heart. Symptoms denoting immediate danger from over-distension are great feebleness of the pulse, intense præcordial distress and dyspnœa with lividity of the prolabia. Under these circumstances ethereal stimulants and alcoholics are to be given freely to avert impending death.

CYANOSIS FROM CONGENITAL MALFORMATIONS OF THE HEART.

The term cyanosis has been used in the preceding pages to denote a symptom incident to various diseases of the respiratory and the circulatory system. It denotes in like manner a symptom when, for convenience, it is used as the name of an affection called also, morbus cæruleus, cyanopathy, and the blue disease. In the latter sense it implies a congenital malformation of the heart. Here, as in other connections, the pathological condition which the symptom represents, is chiefly or exclusively congestion of the systemic veins. The circulation of imperfectly oxygenated blood, or of a mixture of venous with arterial blood, is a subordinate factor in the production of the cyanotic appearance.

The diagnosis of cyanosis dependent on congenital malformations of the heart, is made without difficulty. More or less lividity of the prolabia and skin existing at birth or appearing shortly afterward, not dependent or pulmonary atelectasis, and persisting, is the diagnostic criterion. The physical signs show cardiac lesions. In a majority of cases the lesions involve obstruction in the pulmonary artery, or at its orifice, and in these cases a pulmonic direct murmur (*vide* page 174) is a frequent sign. Deficiency of a part of the ventricular septum may also give rise to murmur. The right ventricle and auricle are more or less enlarged.

The cyanotic condition varies much in different cases. It is notably increased by muscular exercise, paroxysms of crying, efforts of nursing, and fits of coughing. Under these circumstances, the lips, cheeks, nose, ears, and the ends of the fingers may become extremely livid. When the patient is perfectly at rest, lividity may be slight or not appreciable. The variations in degree of the affection, of course, represent corresponding differences in the amount of obstruction to the venous circulation caused by the heart-lesions.

The affection proves fatal within periods varying from a few weeks to a year, in a proportion of about one-third of a given number of cases. Considerably more than one-half of patients die under ten, and the vast majority under twenty, years of age. In a few cases life is prolonged into middle age.

The avoidance, as far as possible, of causes which excite the action of the heart, remedies to meet symptomatic indications, together with measures to promote assimilation and nutrition, constitute the treatment.

ANGINA PECTORIS.

Angina pectoris may be defined, a neuralgic affection incident, in most cases, to structural lesions of the heart, and involving danger of sudden death.

The affection is paroxysmal, and a typical paroxysm presents the following distinctive features: The pain is intense; it appears to have its point of departure in the præcordial region, or beneath the sternum, extending thence into the back, shoulders, very frequently down the left arm, either to the elbow, or into the forearm and fingers, in rare instances limited to the right upper extremity, oftener affecting both upper extremities, occasionally shooting into one or both of the lower limbs, and sometimes felt in the back of the neck and head. The pain in the limbs is accompanied by a feeling of numbness. In connection with the pain, there is a sense of præcordial constriction, an indescribable anguish which has been termed a "heart-pang," and a feeling of impending death. The action of the heart is generally disturbed, the pulse being weak, irregular and intermitting. The frequency of the pulse in most cases is increased, but it is sometimes notably diminished. Exceptionally the pulse is regular during the paroxysm. The patient maintains a fixed position of the body, frequently grasping some firm support, apparently being afraid to move or to speak, and sometimes even to take a full breath. The face has a death-like pallor, and is sometimes livid. The surface of the body is cold, and sometimes there is copious sweating. The facies expresses anxiety or terror. Consciousness and the mental faculties are intact.

The paroxysms last for a few seconds or a few moments only, in the great majority of cases. Instances in which they have a duration of even an hour are not common. They may, however, continue for many hours. The author has met with a case in which the pain was continuous, with frequent exacerbations, for twenty-four hours. The paroxysms recur after intervals which vary greatly in different cases. The period of exemption may be years, months, days, hours, or minutes. Their continued recurrence, after intervals of longer or shorter duration, is the rule, to which there are some exceptions. Paroxysms are often excited by obvious causes such as the exertion of walking especially against the wind, ascending an acclivity, emotional excitement, and over-repletion of the stomach. Patients sometimes are exempt from attacks so long as they are careful to avoid all exciting causes. But in most cases, sooner or later, paroxysms recur when the body and mind are at rest, and without any appreciable causation. They may take place during sleep. Perhaps there is not a more distressing spectacle of exquisite physical suffering than that of a patient with severe paroxysms of this affection recurring many times daily for a series of days, or weeks, or even months. Death in such cases may be truly called a happy deliverance.

When the distinctive features are well marked, the diagnosis of a paroxysm of angina is easy, especially if it be witnessed by the physician. There is room for doubt only when the diagnostic traits are less distinct, and when knowledge of them is obtained wholly from a description by the patient. The pain may be comparatively slight: the peculiar anguish is not always felt; the heart's action sometimes continues without disorder, and all the associated symptoms are less striking. Attacks which present the characters of angina, but which are devoid of severity, have been considered as not properly examples of the affection, and they have been distinguished as attacks of simulated or pseudo-angina. As it seems to the author, this view is incorrect, and, hence, angina is an affection which may be presented in a severe and in a mild form.

Mild angina is to be discriminated from intercostal neuralgia. In the latter affection pain may be referred to the præcordia, and it may extend to the shoulder and arms. The diagnostic criterion of intercostal neuralgia is to be sought after (*vide* page 146). The long duration of the pain is a point in evidence against angina. The age of the patient and the sex are to be considered. Angina occurs much oftener in males than females, the reverse being true of intercostal neuralgia. Angina rarely occurs prior to middle age, whereas, intercostal neuralgia is more frequent in youth.

From the fact that angina in most cases is incident to structural disease of the heart, the signs of the latter are to be taken into account in the diagnosis. The fact that it is sometimes incident to aortic aneurism is to be borne in mind. Aortic, more frequently than other valvular lesions, are present. Undoubtedly, angina may occur without structural disease of the heart, as determined, not alone by the absence of physical signs, but by the recovery from the anginal affection and the subsequent history of the patient. It must be considered that structural disease may exist without affording signs sufficient for its recognition. This is true of calcification or thrombosis of the coronary arteries, and a certain amount of fatty degeneration of the walls of the heart; and with each of these lesions angina has been found associated.

Treatment of Angina Pectoris.

The treatment during a severe paroxysm of angina has for its object speedy relief. The importance of this object extends beyond the relief of suffering; it embraces the prevention of sudden death. The danger of death in a paroxysm is to be estimated, not so much by the intensity of pain and other subjective symptoms (although these have significance in that relation), as by the characters of the pulse, taken in connection with the nature and extent of the cardiac lesions. A patient who has free aortic regurgitation with dilatation of the left ventricle, or extensive fatty degeneration of the heart, is very liable to die in a paroxysm which is not severe. Such a patient is liable to sudden death without angina; and when a paroxysm proves fatal, it is not the neuralgic affection which kills, but the death is due to conditions destroying life in other cases without pain. The prognosis during a paroxysm is grave according as the pulse is small and irregular.

To relieve the suffering and avert sudden death, cardiac stimulants (ethereal or alcoholic) should be resorted to promptly and efficiently. The author, some years since, was summoned in great haste to see a gentleman, living in an adjoining house, with the characteristic symptoms of an attack of angina. The disturbance of the circulation was such that death appeared to be imminent. Several ounces of brandy were instantly given, and in a few moments the regular action of the heart was restored, with complete relief of suffering, and the patient, a man of philosophic equanimity, chatted pleasantly, as if nothing had happened. He was apparently rescued from impending death. Proper warning of the danger incident to a recurrence of the affection, was given privately to the patient's wife. Several months afterward, the author had visited and prescribed for this patient for a trivial ailment, and a few moments after leaving the house he was recalled in urgent haste. An attack of angina had occurred in the interval, proving almost instantly fatal. After a severe attack of angina, instructions should be given to keep at hand ethereal and alcoholic stimulants, to be at once given on a recurrence. By these precautions death may be postponed. A physician summoned when a paroxysm occurs, can rarely see the patient before it ends either fatally or otherwise.

The nitrite of amyl is a remedy of great potency in promptly relieving a paroxysm of angina. The author has known of several cases in which it has proved effective. A patient who for several years has been subject to almost daily attacks in a mild form, is never without this remedy, and it has never failed to afford instant relief. From three to five drops are to be inhaled from a handkerchief directly the paroxysm occurs.

In a severe paroxysm, opium is indicated; but usually there is not time for its effect to be produced before the paroxysm ends.. Its effect is, of course, more prompt if administered hypodermically.

Sinapisms, the application of a heated hammer, other rubefacients, and stimulating pediluvia, are of minor consequence, and they are perhaps useful chiefly for a moral effect. In mild paroxysms the indications for prompt and efficient treatment may be less urgent; but it is to be recollected that if the affection be associated with cardiac lesions in themselves involving liability to sudden death, the danger may be great notwithstanding the comparative mildness of the symptoms. Moreover, a recurring paroxysm may be severe, however mild may have been the preceding paroxysms.

In the intervals between the paroxysms, the most important part of the treatment is the avoidance of exciting causes. Next in importance is the improvement of the general health by appropriate medicinal and hygienic treatment. Associated cardiac lesions are to be treated according to their character and the symptoms, weakness of the heart from dilatation or fatty degeneration claiming especial attention. Judicious management having reference to these points will be likely to diminish the liability to recurrence of the paroxysms, their severity, and the danger therewith connected.

Certain remedies which are useful in other neuralgic affections, apparently, in some cases, have a good effect in this affection. These are, quinia in full doses, belladonna, prussic acid, valerianate of zinc, arsenic, and the bromine salts. Faradization has been found effectual in promptly arresting a paroxysm. Duchenne has reported a case in which a cure was apparently effected by general faradization. A case has also been reported by Beard and Rockwell.[1]

In view of the danger of sudden death, the physician properly feels a peculiar anxiety and responsibility in the treatment of cases of angina pectoris; but it is to be borne in mind, in the way of encouragement, that patients may suffer from recurrent attacks indefinitely, death finally taking place from some intercurrent disease, and also that, when unaccompanied by disease of the heart or aorta, the paroxysms may cease to recur. The author has reported several cases of recovery which have fallen under his observation.[2]

---

[1] Practical Treatise on the Medical and Surgical Uses of Electricity, second edition, 1875, p. 668.

[2] *Vide* Treatise on the Diseases of the Heart, second edition, p. 293, 1870.

IV.

FUNCTIONAL DISORDER OF THE HEART.

INCREASED FREQUENCY OF THE HEART'S ACTION, DIMINISHED FREQUENCY OF THE HEART'S ACTION, INTERMITTENCY OF THE HEART'S ACTION, IRREGULARITY OF THE HEART'S ACTION, REDUPLICATION OF HEART-SOUNDS, DIAGNOSIS AND TREATMENT OF FUNCTIONAL DISORDER OF THE HEART, FUNCTIONAL DISORDER OF THE HEART ASSOCIATED WITH STRUCTURAL DISEASE, GRAVES' DISEASE.

DISORDER of the heart, manifested by deviations from the normal frequency, force, and rhythm of its action, is functional when not dependent on either inflammation or structural disease of this organ. According to this definition, it is not requisite, in order that a disorder be purely functional, for the heart to be free from disease. Disorder is functional although lesions exist, provided the association be accidental or without any relation of cause and effect. In fact, an important practical point in diagnosis is to determine, in certain cases, that functional disorder is superadded to lesions, and not dependent upon them.

Palpitation (hypercinesia) is the term commonly applied to the form of the disorder most frequently met with in practice. In this form it occurs in paroxysms of a violent, tumultuous, or, on the other hand, a feeble and fluttering action, with more or less disturbance of rhythm or irregularity, the frequency sometimes, during the paroxysms, being very great, as shown by a pulse which may be 200 or more per minute. The patient is distressingly conscious of the disordered action, and it is attended often with a sense of danger of sudden death. The paroxysms are sometimes of momentary duration, but in some instances they continue for hours or even days. They recur after short or long intervals, and they are especially apt to take place during the night.

There are several varieties of functional disorder differing from the common form sufficiently to call for separate notice.

INCREASED FREQUENCY OF THE HEART'S ACTION.

In this variety the pulse is abnormally frequent, 100 or more per minute, persistently for days, weeks, months, or years. The frequency becomes greatly increased by exercise or mental excitement. Patients with this form of disorder may suffer also from paroxysms of palpitation, but, in some instances, the action of the heart is regular, the increased frequency being the only characteristic.[1] A remarkable illustration of this variety is furnished by the disease known as exophthalmic goitre,

---

[1] Da Costa, who has reported cases of this variety, occurring especially among soldiers in the late civil war, attributes the disorder to an "irritable heart;" *vide* Medical Memoirs of the United States Sanitary Commission, 1867, and the American Journal of the Medical Sciences, Jan. 1871.

Graves' or Basedow's disease. Before concluding that a frequent pulse denotes a functional disorder of the heart, it must be determined that the frequency is not a normal peculiarity. Some healthy adults have a pulse of 100 or more.

DIMINISHED FREQUENCY OF THE HEART'S ACTION.

This has not hitherto been generally recognized in text-books or treatises on diseases of the heart, as one of the forms of functional disorder. In a paper published in 1875, the author has reported five cases in which severally the frequency of the pulse was diminished to 40, 35, 26, 38, and 26 pulsations per minute. In one of these cases, there was marked intermittency, and in one there was for a time inequality, the rhythm in the other cases being regular.[1] In determining that an infrequent pulse is abnormal, it must be ascertained that the infrequency is not a normal peculiarity. The pulse in some healthy persons is not above 40 per minute. It is also to be ascertained that the infrequency of the pulse is not due to another variety of functional disorder in which, from weakness of a certain number of the ventricular systoles, they are not represented by an appreciable radial pulse. Notable infrequency of the heart's action may be an acquired, as well as a congenital normal peculiarity.[2]

INTERMITTENCY OF THE HEART'S ACTION.

A suspension of the action of the heart for a period of one, two, or more revolutions, occurs in ordinary palpitation, and in connection with the other varieties of functional disorder; but, in some cases, it is the chief or sole characteristic. The patient is conscious of the stoppage which is represented, of course, by an intermission of the pulse, and has a feeling of danger of instant death. Intermittency of the pulse representing an intermission of a ventricular systole, recurring, after a certain number of beats, irregularly and sometimes regularly, is with some persons a normal peculiarity. As an acquired peculiarity, it is not uncommon in middle or advanced life. When it has this character, either persons are not conscious of the intermissions, or they do not occasion apprehension. In connection with other forms of disorder the pulse may intermit without a corresponding intermission of the heart's action, the loss of the pulse-beats showing only that some of the ventricular systoles are too weak to cause an appreciable radial pulsation. In this instance, as also when infrequency of the pulse does not represent the action of the heart, an erroneous interpretation of the pulse is avoided by auscultating the heart-sounds. The carotid artery may give appreciable pulsations when they are wanting at the wrist.

---

[1] On a Variety of Functional Disorder of the Heart Characterized by Notable Infrequency of the Pulse, The American Practitioner, No. for January, 1876.

[2] *Vide* case of Dr. Hewan, in which the pulse, having been 72, decreased to 24 per minute, without any evidence of cardiac or other disease. For a case of functional disorder of the heart in which the pulse was diminished to 16 per minute, reported by Pugin Thornton, *vide* Trans. Clinical Society of London, vol. iii. August, 1875. This case is quoted in the author's paper referred to in the preceding note.

INEQUALITY OF THE HEART'S ACTION.

This variety of functional disorder is involved in the instances just referred to where intermittency and frequency of the pulse do not represent corresponding intermittency or infrequency of the heart's action. A curious instance is the occurrence of a ventricular systole too weak to produce an arterial pulsation at the wrist, alternately with a systole which is represented by a radial pulse. This regular irregularity of the heart's action, the author has known to continue for seventeen days. A number of instances in which it continued for a shorter period have fallen under his observation. As the frequency of the pulse is less by precisely one-half, than that of the heart-sounds, this form of disorder is liable to be considered a reduplication of both sounds of the heart. Probably some reported instances of supposed reduplication are to be explained in this way. A case reported as such by the author in 1854, is to be thus explained. The error may be avoided by directing attention to the carotid pulse. The alternate ventricular systoles which are too weak to produce a radial pulse, probably in all cases have strength enough to cause an appreciable pulsation of the carotids.

REDUPLICATION OF HEART-SOUNDS.

In reduplication of heart-sounds, either three or four sounds occur between two beats of the heart, or two pulsations of the carotid artery. The sounds should be compared either with the heart-beats, or the carotid pulse, in order to avoid the error of confounding this variety of disorder with that last noticed. Such an error, however, can only be committed when both sounds of the heart are reduplicated; and instances of this are exceedingly rare. Reduplication limited to the first sound is extremely infrequent. Reduplication limited to the second sound is not uncommon. When the second sound is reduplicated, the two sounds follow in quick succession. The succession of the triple sound is compared by Bouillaud to the rebound of a hammer on an anvil; and he compares the rhythm, when the first sound is reduplicated, to the tattoo (rappel) of the drum, or the sounds of the feet of a galloping horse.

This disorder is incident to cardiac lesions, but it occurs when the heart is free from disease. It is clinically interesting, but not important, and is not to be considered among the functional disorders which claim treatment.

THE DIAGNOSIS OF FUNCTIONAL DISORDER OF THE HEART.

The functional character of a disorder of the heart is rendered certain by the exclusion of inflammations and structural affections. A positive diagnosis is in this way established. Inflammatory and structural affections, in the great majority of cases, may be excluded. As a rule, valvular lesions do not exist without murmurs. Enlargement of the heart is easily determined. The occult lesions are rare, and moreover, they are not likely to give rise to the symptoms which characterize the different varieties of functional disorder.

In cases of functional disorder in which the action of the heart is frequent and forcible, the first sound, as heard over the apex, is notably loud, short, and valvular. These characters are due in part to the fact that the ventricular contractions have a spasmodic character, and in part to the fact that, the ventricles containing but little blood at the time of their contractions, the curtains of the auriculo-ventricular valves have a wider range of motion than when the ventricles are filled. Under these circumstances the valvular element of the sound is intensified, the element of impulsion being feeble or wanting. The sound is like that heard when the stethoscope is applied directly upon the exposed heart in an animal of some size, as a dog or sheep. It is doubtful if an endocardial murmur be ever produced solely by functional disorder; but an anæmic murmur may be intensified in a paroxysm of palpitation.

TREATMENT OF FUNCTIONAL DISORDER OF THE HEART.

The physician is often summoned to patients suffering from a paroxysm of palpitation, and the immediate object of treatment is speedy relief. If the action of the heart be violent, an opiate is the most reliable remedy. To secure its effect as promptly as possible, the hypodermic method of administration may be employed. In mild paroxysms speedy relief is often obtained by ethereal and antispasmodic remedies, namely, Hoffmann's anodyne, chloric ether, the compound spirits of lavender, the valerianate of ammonia, etc. If the action of the heart be weak, fluttering, and intermittent, from half an ounce to an ounce of spirit should be given and repeated in half an hour if relief be not obtained. An opiate should also be given if the paroxysm be severe. Sinapisms may be applied to the præcordia, and, if the extremities be cold, a stimulating pediluvium is useful. If, as is often the case, the patient be apprehensive, this mental condition tends to increase and maintain the disordered action of the heart. Immediate relief sometimes follows a positive assurance of the absence of any danger. In order to be able to do so, the physician should ascertain by percussion and auscultation the absence of structural disease, and base his assurance on the result of the examination. With reference to this important part of the treatment, the physician who is confident in his ability to exclude structural disease, has a great advantage over one who is doubtful in that regard. The application of cold to the præcordia in the form of compresses dipped after short intervals in ice-water, or of the iced bag,[1] is said to afford relief.

As a palliative in cases of persistently increased frequency of the heat's action, aconite is a valuable remedy, given in doses of from one to four minims three or four times daily. The author has known this remedy to be continued with advantage for years in cases of exophthalmic goitre.

In cases of notable infrequency of the heart's action, alcoholic stimulants are to be given freely, watching their effect upon the circulation.

In each of the different forms of purely functional disorder, the physician is justly warranted in giving a positive assurance of the absence of danger, and the certainty of relief.

---

[1] Article by Schroetter, in Ziemssen's Cyclopædia, Am. ed., vol. vi. p. 306.

The causative indications are of the first importance with reference to curative treatment. Anæmia, the use of tobacco, excessive indulgence in coffee or tea, especially the latter, sexual excess, indigestion, and prolonged mental depression, are the most frequent causes. With the exception of the last of these causes, they are controllable. and their removal will often suffice for the cure. Mental depression is not infrequently connected with the apprehension of organic disease and of sudden death. The physician, if competent to form a diagnosis on the basis of an exclusion of organic disease by the absence of physical evidence, may be able to remove this cause of mental depression.

Anæmia and indigestion claim, of course, appropriate treatment. The gouty diathesis is an occasional cause, and the disorder of the heart ceases when this is relieved.

Certain persons have a predisposition, innate or acquired, to functional disturbance of the heart. At all events, there are those who, during their whole lives, are subject thereto. After a time they become accustomed to it, and experience much less annoyance than at first. Patients may be assured with confidence that recurrences of functional disorder do not produce structural disease. Assurance on this point constitutes an important part of the moral treatment.

Functional Disorder of the Heart associated with Structural Disease.

The fact that persons having structural lesions of the heart may suffer from functional disorder not dependent on the lesions, has been already referred to. Of course, in proportion as the organ is damaged by lesions, the inconvenience or distress occasioned by functional disorder is increased. A patient with valvular lesions and enlargement, not sufficient in themselves to give rise to much, if any, appreciable disturbance, may suffer greatly from the operation of the causes which produce disorder in the sound heart. With reference to prognosis and treatment, it is sometimes an important, but not a very easy, problem to determine how far symptoms are attributable to an existing organic disease, and how far to superadded functional disorder. With reference to this problem, these questions are to be considered: Are the symptoms out of proportion to the amount of organic disease as judged of by means of physical signs; and are the causes of functional disorder, *e. g.* anæmia, operative in the case? The marked benefit of measures of treatment directed to the functional disorder, furnishes, in some instances, a very happy solution of this problem.

Exophthalmic Goitre, Exophthalmic Cachexia, Graves' Disease, Basedow's Disease.

The remarkable affection known by the several names given in the above heading, is characterized by features so obvious and striking, that, with a knowledge of them, it cannot fail to be at once recognized. As regards diagnosis, it is sufficient to state the characteristic features of the affection.

Notable increase of the frequency of the heart's action is the primary symptom, and is constant, usually without any disturbance of rhythm or irregularity. The pulse in different cases varies from 100 to 140 per minute. This frequency may continue for successive months and years. The habitual frequency is much increased by exercise and mental emotions. Structural disease of the heart, if it exist at the outset, is associated by coincidence only. The increased frequency of the heart's action may after a time lead to hypertrophy.

Enlargement of the thyroid bodies follows after a variable period. They enlarge rapidly in a moderate degree, and the enlargement then ceases. Generally both lobes are enlarged, but the enlargement is sometimes limited to one side. A pulsation is felt when the hand is applied to them, and sometimes a marked thrill or fremitus. With the stethoscope applied to them, a loud systolic murmur is heard. The murmur is sometimes continuous.

Coincident with, or succeeding the goitre, exophthalmia takes place. Both eyes are simultaneously affected as a rule; but in some cases the affection is limited for a time to one eye. The globes become more or less projecting. The projection may be so great that the eyelids fail to cover the globes; the cornea, remaining constantly exposed, is liable to become inflamed, and ulceration sometimes takes place. The expression given by the prominence of the eyes is so striking as at once to arrest the attention of an observer, and is a cause of much mortification to the patient. The projecting globes are easily pressed backward into the orbit, but the projection returns when the pressure is withdrawn. It has been observed that the co-ordinate movements of the upper lid with the globe of the eye, do not take place as in health, and that this symptom precedes the exophthalmia. If the patient look downward, the upper lid does not follow the movement of the globes, "a broad band of sclerotic being visible above the cornea."

Cases in which increased frequency of the heart's action persists, as in this affection, but without goitre and exophthalmia, are occasionally met with. They have been referred to in connection with functional disorder of the heart. This increased frequency of the heart's action is sometimes accompanied by goitre, without exophthalmia, and the author has observed the latter without the former. In most cases, patients are anæmic; but this condition is not invariably present. There is usually much nervous irritability; insomnia is a frequent symptom, and patients suffer from the consciousness of the action of the heart, together with throbbing of the head and neck. Women are far more subject to the affection than men. It is a rare affection in women.

Treatment of Exophthalmic Goitre.

This is rarely in itself a fatal affection, but, by impairing the power of resisting other affections, it may contribute to their fatality. Its intrinsic danger is in the dilatation of the heart with which, after a long duration, it may become complicated. It continues indefinitely, and the proportion of instances of complete recovery is small. After reaching a certain degree of development, it persists without further progress, and considerable improvement may take place in cases which do not end in recovery.

The treatment should embrace the best attainable hygienic influences, mental and physical. All causes tending to excite or disorder the heart's action should be removed, such as the use of tobacco, alcoholics, strong coffee or tea, violent exercise, mental excitement, and excesses of any kind. Anæmia, if it be present, is to be treated by chalybeates which are to be continued for a long period.

Remedies advocated as sometimes efficacious are, the sulphate of quinia in full doses, arsenic, the bromine salts, digitalis, ergot, and aconite. Of the relative merits of these, an opinion can hardly be formed from personal observation, as the affection is so rare that individual clinical experience, however large, cannot embrace a great number of cases. So far as the author's experience goes, the tincture of aconite, in doses of from one minim to seven minims three times daily, has proved most successful.

The hydropathic treatment was considered the most efficient by Trousseau. Jaccoud says that the whey and the grape cure are more efficacious than any pharmaceutic preparations, without, however, citing the facts on which he bases this statement. Galvanization, by the direct current, of the cervical sympathetic nerve is considered by some German observers, and by Bartholow in this country, as adequate to effect a cure.[1] Professor William Pepper, in addition to the benefit derived from ergot given internally, has effected a complete reduction of the thyroid enlargement by the injection into the gland, by means of a needle introduced to the depth of half an inch to an inch, weekly, of from six to ten minims of a solution containing ninety-six grains of ergotine in an ounce of distilled water.

As an illustration of the apparent efficacy of aconite in very small doses in conjunction with iron, the following case is cited: Mrs. E., aged forty-six, consulted the author in Dec. 1873. The affection had existed for two years. There was moderate enlargement of the heart, with loud anæmic murmur at the base. She was fifteen pounds under her average weight of health. The tincture of aconite, in doses of one drop, and two grains of reduced iron, three times daily, were prescribed. In April, 1874, her husband reported very great improvement. In June, 1876, the patient came with a relative for advice respecting the health of the latter. Her appearance was healthful. The prominence of the eyes and the goitre were slight. Her weight had increased forty pounds. She had continued the aconite in the same doses, and was still continuing it. She had also taken the iron nearly all the time.

A young woman with this affection, at present under observation, has taken the tincture of aconite for ten months, the quantity, most of the time, seven drops per diem. This has constituted the treatment from the commencement, the patient not being anæmic. The improvement is marked, and the general health is excellent.

---

[1] *Vide* article by Bartholow in Trans. Am. Med. Association, 1875. For report of a case in which a cure was effected by galvanism, by an Italian physician, Dr. Ancora, *vide* Am. Journ. of Med. Sciences, July, 1878, p. 256.

V.

DISEASES OF THE VESSELS.

AORTITIS, THORACIC ANEURISM, ABDOMINAL ANEURISM, THROMBOSIS AND EMBOLISM.

INFLAMMATION and structural lesions of the vessels—arteries, veins, and lymphatics—of the limbs, or in situations which may be explored by the eye or touch, and which are accessible for surgical operations, belong to the province of surgery. Medicine proper embraces only those vascular affections which are situated internally, not admitting of direct examination, either visual or tactile, and which are beyond the reach of the surgeon. From a clinical stand-point, that is, regarding those affections only which are within the scope of diagnosis, this division of the diseases of the circulatory system is still further restricted. The few affections to be considered under the present heading are, aortitis, thoracic and abdominal aneurisms, embolism and thrombosis.

AORTITIS.

Acute inflammation of the aorta (including under this head periarteritis, mesarteritis, and endoarteritis) is extremely rare, and is probably always secondary either to endocarditis or an inflammatory affection in an adjacent situation. Under these circumstances, to quote the language of Jaccoud, it has no individual symptomatology, and, as regards any diagnostic expressions, it is absolutely mute. It may lead to suppuration and ulceration, and, as a consequence of these results, to a purulent or septicæmic infection of the blood. Quoting the words of the author just named, "Among the possible effects of acute aortitis, one only can lead to a suspicion of its existence; this is a purulent infection appearing suddenly in a person who had not been exposed to any of the ordinary pathogenic influences of pyæmia. If, in such a case, an examination of the heart gives a negative result, ulcerative endocarditis, which would suggest itself, being excluded, the diagnosis of acute aortitis becomes at least probable."

Chronic aortitis, giving rise to atheromatous degeneration and calcification (deforming endoarteritis, arterio-sclerosis), seated in the ascending aorta, is sometimes determinable by means of auscultation. A systolic murmur which is not anæmic, which has its maximum sufficiently above the heart to show that it is not produced at the aortic orifice, and which may be heard in the direction of the transverse or even the descending portion of the arch, is evidence of structural changes attributable to chronic aortitis. Additional evidence is afforded by the presence of a murmur which, as the author supposes, he was the first to describe, and which he has named a prediastolic aortic murmur. This murmur can only be recognized when the aortic valve is sufficient. It is caused by the retrograde movement of the column of the blood, the latter caused by the recoil of the arterial coats directly the ventricular systole ends, and which produces the closure of the aortic valve. If there be aortic insufficiency, this murmur is lost in the aortic regurgitant murmur. The name prediastolic denotes its occurrence just before the aortic second sound. It is preceded by a systolic murmur referable to the aorta. The period from the end of the onward movement of blood in the aorta to the closure of the valve or the occurrence of the second sound, is extremely brief, and the extent of the retrograde movement of the blood is probably not more than an inch, yet, a murmur during this period, produced by the retrograde movement of blood, the aortic valve being intact, may be distinctly perceived. The author has been accustomed for many years to demonstrate this murmur.

The lesions incident to chronic aortitis have little clinical importance, inasmuch as they furnish no therapeutical indications. With the knowledge of their existence, however, patients should be instructed to avoid causes of over-exertion of the heart as precautionary against aneurism, embolism, and, possibly, rupture.

THORACIC ANEURISM.

The diagnosis of thoracic aneurism can only be made by means of physical signs. Certain symptoms should excite a suspicion of the affection, but adequate proof of its existence can never be derived from purely symptomatic evidence. The age of the patient is to be considered in connection with symptoms which may suggest the affection; it occurs very rarely prior to middle life. It is well to bear in mind the situation in which it occurs most frequently, namely, at, or near, the junction of the ascending and the transverse portion of the arch. The signs, conjoined with symptoms, generally denote the site of the aneurismal tumor, and the direction in which it projects from the vessel.

The diagnostic problem is not difficult when an aneurismal tumor has come into contact with the thoracic parietes, and especially when it has either made its way through the chest or produced a circumscribed prominence corresponding to its size and situation. Within the area of the tumor a pulsation, more or less strong, is seen and felt, which is synchronous with the ventricular systole; there is dulness or flatness on percussion within this area; the heart sounds are notably loud, perhaps louder than in the præcordial region; a single or a double murmur is heard in the majority of cases, and not infrequently a thrill is perceived by the fingers placed over the site of the tumor. With more or less of these signs present, the chief liability to error is when an intra-thoracic tumor, extrinsic to the artery, is in contact with it, or when, in a case of empyema, perforation has taken place at a point in the course of the aorta, and a fluctuating, pulsating tumor is thereby produced. The author has met with an instance of the latter, the tumor being precisely in the situation where an aneurism is most likely to be found, namely, at the second intercostal space near the right margin of the sternum. In such a case, examination of the chest cannot fail to correct the error of a first impression, for the signs show the chest to be full of liquid, and, if thoracentesis be employed, the tumor disappears. A circumscribed intra-thoracic solid tumor so situated as to simulate the signs of aneurism, may almost be excluded on the ground that the chances are greatly against its existence.

Another liability to error is when, from shrinkage of the lung incident to phthisis, or after pleurisy, the aorta, or the pulmonary artery, in the second intercostal space close to the sternum, is uncovered and in contact with the walls of the chest. Under these circumstances, a pulsation is perceived on the right or left side of the sternum. The fact of the shrinkage of lung can be determined or rendered probable by physical signs; there is no bulging at the situation of the pulsation, and the evidence of tumor afforded by dulness on percussion within a circumscribed area, is wanting.

As regards aneurismal murmurs, the author cannot agree with those who state that they are oftener absent than present. According to his experience a murmur is exceptionally wanting. That it is not always present, is certainly true, and hence, aneurism can by no means be excluded by the absence of murmur. Nor can he agree to the statement that a double murmur heard over an aneurism necessarily implies aortic regurgitation. A diastolic murmur may exist without insufficiency of the aortic valve, attributable, probably, to the recoil of the coats of the aneurism. It is important in this connection to state that the presence of an extrinsic tumor upon the artery may give rise to a systolic murmur; hence, a murmur over an artery is no more proof of an aneurism than the absence of a murmur is evidence against it. Further, an extrinsic tumor pressing upon the vessel may cause a double murmur. This fact, which the author supposes to be at variance with general belief, he has repeatedly verified. Of the physical signs of aneurism, the tactile thrill is the most distinctive, and, hence, this is to be sought after with care in doubtful cases; but the absence of this sign is by no means proof against aneurism. The diagnostic problem is more difficult when the aneurismal tumor springs from the transverse portion of the arch beneath the sternum, or from the descending aorta, and takes a direction which does not bring it into contact with the walls of the chest, that is, a direction upward, downward, or backward. The local diagnostic signs—circumscribed bulging, pulsation, thrill—are then wanting, and neither murmur nor intensity of the heart sounds may be perceived. Dulness on percussion within a limited area in the course of the aorta, is a sign of value, especially if there be no symptoms of pulmonary disease. Within this area auscultation may reveal bronchial respiration and perhaps bronchophony—signs due to condensation of lung from pressure at the borders of the tumor. If, within the area of dulness, a murmur which is not transmitted from the aortic orifice be heard, or if the heart sounds be abnormally loud, these are significant local signs. But the diagnosis involves certain signs and symptoms caused by the pressure upon adjacent parts by the aneurismal tumor, or local irritation excited by it. These should excite a suspicion of aneurism in a person over forty years of age. Moreover, they not only constitute diagnostic evidence of aneurism, but they denote the portion of the aorta with which the aneurismal tumor is connected, and its direction. The following list embraces signs and symptoms caused by the pressure of the tumors: 1. Suppression or diminished intensity of the respiratory murmur over one side of the chest, the murmur on the opposite side being increased. If the murmur be suppressed or diminished on the right side, the tumor is situated near the junction of the ascending and transverse portion of the arch, and extends in a latero-posterior situation. If the suppression or diminution be on the left side, the tumor is situated near the junction of the transverse and descending portion of the arch, and extends backward. The cause of this notable effect is the pressure of the tumor on one of the primary bronchi. The relations of the left bronchus to the aorta is such that this effect is much more likely to be produced on the left than on the right side. A tumor not aneurismal may be so situated as to press upon and obstruct a primary bronchus. The most frequent of non-aneurismal tumors having this effect is an enlarged bronchial gland. This occurs much oftener in persons under, than over, forty years of age. Considerable obstruction of a primary bronchus causes deficiency of breath on exercise, but not when the patient is at rest.

2. Feebleness of the respiratory murmur on both sides is caused by the pressure of the tumor upon the trachea. This occurs when the aneurism is connected with the transverse portion of the cord, and projects backward. If the obstruction be considerable, dyspnœa is marked, and the breathing is accompanied by stridor. The obstruction in some cases is sufficient to prove the immediate cause of death.

3. The tumor projecting backward from the transverse or descending portion of the arch, may obstruct, by compression, the œsophagus. The patient suffers from difficulty in deglutition, and this may lead to exhaustion from inanition. Exploration with the probang should be practised cautiously in order that, if the obstruction be due to aneurism, the aneurismal sac be not ruptured by the forcible introduction of the instrument. The difficulty in deglutition is sometimes lessened by inclining the body forward, thereby causing the tumor to gravitate from the œsophagus.

4. An aneurism springing from the outer aspect of the ascending aorta, may press upon the superior vena cava, and obstructing the return of blood from the head and upper extremities, these portions of the body present fulness of the veins, lividity and œdema, in striking contrast with the trunk and lower limbs, the latter being free from appearances of venous congestion. Or, the aneurism, taking an upward direction, may obstruct the left vena innominata, the result being venous congestion limited to the left side of the head, and the left upper extremity.

5. A general cyanotic appearance may be caused by an aneurism connected with the inner aspect of the ascending aorta, the tumor pressing upon the pulmonary artery. The same effect may be produced by a tumor on the outer aspect of the ascending aorta, which presses on the right auricle. The pressure on these two parts may give rise to general dropsy.

6. The tumor situated near the origin of the arteria innominata, on the one hand, and the left carotid or subclavian artery, on the other hand, may press upon these arteries, producing complete or partial obstruction. The effect of obstruction of the innominate artery is weakness or suppression of the radial and carotid pulse on the right side, and, on the left side, weakness or suppression of one or both of the corresponding arteries.

Inequality of the pulse on the two sides, or its absence on one side, if not due to a congenital anomaly, is suggestive of aneurism, in a patient in middle life. Another significant symptom is retardation of the pulsation of certain arteries. If the aneurism be between the innominate and the left subclavian, the left radial pulse is not synchronous with the right, but lags behind it. So, if the aneurism be situated in the descending aorta, the pulsations in the lower, lag behind those of the upper, limbs.

7. The pressure upon the recurrent laryngeal nerve produces symptoms referable to the larynx. Owing to the relations of this nerve to the aorta on the left side, it is most apt to become involved in aneurisms seated at or near the junction of the transverse and descending portion of the arch. Compression of the nerve on one side causes unilateral paralysis of the vocal cords. Respiration is rarely affected, but the voice is rough or hoarse, and there may be aphonia. The change in voice might lead to the supposition of chronic laryngitis. There is this difference as regards the voice: it is not stridulous. and the patient does not speak with a manifest effort, as in cases of laryngitis. However, the laryngoscope shows the movements of the vocal cord on the affected side to be impaired or lost, and that the appearances of inflammation are wanting.

Spasm of the glottis is an effect of the irritation of the nerve in some cases. The paroxysms of spasm are sometimes so frequent and severe as to involve danger, and to warrant laryngotomy or tracheotomy.

The following case illustrates the diagnostic significance of laryngeal spasm, and is also interesting from the occurrence of rupture nearly three months before death: Mr. W., aged 47, was seen and examined by the author Sept. 1st, 1869. He had complained of pain in the left side of the chest near the nipple for several months, and had suffered from the frequent recurrence of paroxysms of dyspnœa which were sometimes severe. The signs were slight dulness on percussion between the first and third ribs on the left side, and feeble respiratory murmur on both sides, the feebleness greater on the left side, neither pulsation nor murmur being discoverable. There were no râles over the chest; no signs denoting disease of heart, and no disparity in pulse or pupils. The paroxysms of dyspnœa were evidently caused by laryngeal spasm; they were accompanied by a croup-like sound in inspiration. On these data was based a probable diagnosis of aneurism. October 7th there occurred at first a slight, and, afterward profuse, hæmoptysis. In the evening this had ceased, and an examination of the chest gave the same results as before. A near relative, being an ardent advocate of homœopathy, induced the patient to place himself under the care of a practitioner of that system, who scouted the idea of aneurism, and promised a cure. The patient's condition improved, and, at the instance of his adviser, he repeatedly came from his residence to New York, a journey by rail of nearly three hours. In the latter part of December the paroxysms of dyspnœa became more distressing than ever before, and on the 4th of January he had a copious hæmoptysis, and instantly expired. The autopsy showed an aneurism at the transverse portion of the arch, with a lacerated opening into the trachea just above the bifurcation.

8. Pressure upon the sympathetic nerve may cause contraction of the pupil of the eye on the side corresponding to the situation of the tumor.

Irritation of this nerve, instead of compression, may cause dilatation, of the pupil. Both effects in alternation have been observed.

9. If the tumor come into contact with the thoracic wall, it causes a localized burning or gnawing pain which is significant when taken in connection with physical signs.

10. The aneurism may be so situated as to press upon the par vagum, and persistent vomiting may be thereby produced.

11. Hiccough from pressure upon the phrenic nerve, and congestion of the lymphatic vessels from pressure on the thoracic duct, have been observed in cases of thoracic aneurism.

An aneurism of the thoracic aorta below the arch, generally causes erosion of the spine and the ribs to the left of the spinal column. Localized pain should excite suspicion. The author has met with a case of empyema, in which perforation of the chest-wall took place near the base on the left side, causing a fluctuating, strongly pulsating tumor which presented the appearance of an aneurism. Puncture of the chest in another situation gave exit to a large collection of pus, and the tumor disappeared.

The practitioner will do well to bear in mind the list of secondary symptoms of thoracic aneurism, in order that, whenever they are met with in practice, he may be led thereby to seek at once for the local signs, and avoid the misfortune of having overlooked the affection until it became conspicuously manifest.

The error of mistaking aneurism for phthisis may occur. In a case which came under the author's observation, an aneurismal tumor extending laterally into the right infraclavicular region, without causing appreciable pulsation, was so considered, and the patient was sent away from home for the benefit of change of climate. Death occurred in this case without rupture, and the nature of the affection was not discovered prior to the autopsy.

Abdominal Aneurism.

The diagnosis of aneurism of the aorta situated below the diaphragm, not less than of thoracic aneurism, must be based on physical signs. An aneurismal tumor extending from the anterior or antero-lateral aspect of the artery, after having attained to a certain size, is perceived by manual examination of the abdomen. It is beneath or to the left of the median line. It is not depressed by a deep inspiration, nor moved laterally by pressure with the fingers. It has usually a strong pulsation. In most cases a systolic murmur is perceived by means of the stethoscope, and sometimes also a diastolic murmur. In a certain proportion of cases a vibration or thrill is perceived when pressure over the tumor is made with the fingers. Pain more or less intense is felt in the seat or neighborhood of the tumor.

The difficulty in the diagnosis is in differentiating an aneurismal tumor from other tumors which may be situated in the neighborhood of the aorta. The affections to be excluded are carcinoma of the stomach or of the left lobe of the liver, and enlargement of the pancreas. The relations of these to the aorta may be such that strong pulsation is perceived, together with, in some instances, not only a systolic but a double murmur. As regards pulsation, the distinctive character of aneurism is an expansile movement not alone upward, but also marked on the lateral aspect of the tumor. If the tumor be not aneurismal, the pulsation may sometimes be arrested by lifting it from the artery, or pushing it to one side. Inclining the body forward may notably diminish the force of the impulse. A well-marked thrill is highly diagnostic of aneurism, if not indeed pathognomonic. Aneurismal tumors rarely have an irregular or nodulated surface, which other tumors often have. The femoral pulse in cases of aneurism is retarded, that is, occurring after the radial pulse. If the non-aneurismal tumor be carcinomatous, the history and symptoms will be likely to offer evidence of the cancerous cachexia, which is wanting in cases of aneurism.

An aneurism arising from the posterior aspect of the aorta, causes erosion of the vertebra, accompanied by constant pain localized in the spine, and by pains in the course of the lumbar nerves and their branches. Paraplegia may be produced. Taking this direction, the aneurism leads to a pulsating tumor on the left side of the spinal column.

Aneurisms seated in other arteries of the abdomen rarely attain to much size, and are not therefore likely to be confounded with those connected with the aorta.

An aortic pulsation in the epigastrium, which may be distinguished as functional, is sometimes so marked to the touch and eye as to lead to an erroneous diagnosis of aneurism. It occurs oftener in young persons than in those of middle or advanced life. It may be accompanied by a systolic murmur; but the murmur is heard along the course of the aorta, that is, it is not circumscribed. It is not attended by the pain which generally attends aneurism. The absence of a tumor can generally be determined. These points suffice for the exclusion of aneurism.

Treatment in Cases of Thoracic and Abdominal Aneurism.

The immediate object of treatment with a view to retard the progress of the affection, and possibly to effect a cure, is to promote the coagulation of fibrin in the form of stratified layers within the aneurismal sac. Theoretically this object involves two important conditions, namely, a regular, uniform action of the heart, and a normal constitution of the blood. As contributing to the first of these conditions, absolute physical quietude has been found to be a successful measure of treatment. This was an essential part of the method of treatment proposed many years since by Albertini and Valsalva, the method embracing, in addition, repeated venesections, and a greatly restricted diet. With our present views, these additional measures are objectionable. More recently Joliffe Tuffnell, of Dublin, in accordance with a plan indicated by Bellingham, has treated with success several cases by conjoining with rest a regulated diet which, however, is not restricted below the requirements for healthy assimilation.

To secure absolute rest, the patient is confined to the bed for a period of from two to three months, even changes of the position of the body without assistance being interdicted. Few persons are willing to endure the hardship of this plan, and perhaps, from want of sufficient co-operation on the part of patients, it has not succeeded in several cases in which the author has attempted to put it in practice. Tuffnell's successful cases seem to make it a duty to propose the plan whenever there is a fair prospect that it can be faithfully carried out. It is a question whether absolute rest, without such a rigid regulation of diet, would not, to say the least, be equally successful. If so, the hardship of the plan would be diminished.

With or without confinement to the bed, the diet should be adequate to healthy assimilation, or, in other words, to a normal constitution of the blood; but indigestion should be avoided. Articles of diet which are likely to excite the heart, from the sympathetic relations of the stomach, are to be avoided, and alcoholics should be withheld. Cardiac sedatives, digitalis, aconite, etc., are indicated if the action of the heart be frequent, or strong, or irregular.

Of remedies which in some special way contribute to the object of treatment, there is, at the present time, one, the value of which is amply attested by clinical experience. This is the iodide of potassium. The author can testify to the remarkable effect of this remedy in some cases which have fallen under his observation, although not effecting a cure in any instance. The remedy may be given in doses increased to 30, or even more, grains three times daily.

A spontaneous cure may take place. The author has not had the good fortune to meet with an example of complete recovery, but the two following cases exemplify notable progress in that direction.

Mr. G., aged 47, broker, an amateur athlete distinguished for his muscular development and strength, was referred to the author by his colleague, Prof. Van Buren, Jan. 27, 1874. He had for several months had some swelling of the fingers of the right hand, a sense of constriction in the upper part of the right side of the chest, but without pain, and recently some deficiency of breath on exercise. The radial and the brachial pulse in the right arm were wanting. There was slight circumscribed projection on the right side at the second rib, near the sternum, with dulness on percussion and obscure pulsation, without murmur. The murmur of respiration over the right side of the chest was relatively feeble. There were no signs of cardiac disease.

He was referred to the author again, August 13, 1874. After the previous examination he suffered greatly from pain in the right upper extremity especially on lying down, so that he passed his nights in a chair for three months. He took for two months the iodide of potassium in doses of five grains three times daily, and afterward, for a short time, digitalis. He had kept about, pursuing his business, but had avoided any unusual muscular exertions. He had lived well, taking wine daily in moderation. There had been lately remarkable improvement in all his symptoms, and on this date the signs of aneurism had almost disappeared. A very feeble impulse was discoverable in the first or second intercostal space; bronchial obstruction no longer existed; the radial pulse had returned, although it was relatively feeble, and the pain in the upper extremity had disappeared. He considered himself well.

In the autumn, after pretty violent muscular exertion thoughtlessly made, he began to have pain in the right shoulder. The right radial pulse became scarcely appreciable. There was a slight projection of the second rib, and a feeble impulse in the first intercostal space. In December the breathing became labored with tracheal stridor. There was no radial pulse on the right side, and the limb on this side was somewhat congested, colder than the left limb, and the fingers of the right hand were bulbous. His appetite, digestion, and nutrition were excellent. He kept about his business until the following April, when he was seized in the night-time suddenly with intense dyspnœa from spasm of the glottis, losing for a time his consciousness. The dyspnœa persisted, with frequent exacerbations, and tracheotomy was performed with some temporary relief, but death took place by apnœa on the fifth day after the attack. The autopsy showed an aneurismal globular tumor of about the size of a small orange at the upper part of the ascending portion of the arch. This was solid, containing laminated fibrin. At the upper and posterior aspect of this tumor was what had the appearance of another small tumor which projected in a direction to produce notable flattening of the lower part of the trachea. It was inferred from the appearances that the small projecting tumor had occurred since the preceding autumn; and, excluding this secondary development, the aneurismal sac exemplified the process of cure.

The second case was observed in Bellevue Hospital. The patient, aged thirty-eight, was admitted in Jan. 1873. He had noticed a pulsation in the site of the anuerism for the preceding two years. After remaining in hospital for some time, he was discharged. He was readmitted in October, 1874. The signs of an anuerismal tumor at the junction of the ascending and transverse portion of the arch had become more marked. In March, 1875, the tumor had made its way through the chest wall, and projected considerably above the plane of the chest. Subsequently the skin over the tumor became reddened, and it seemed probable that rupture externally would before long take place. During the summer and autumn, however, the tumor gradually receded within the chest, and in November the patient was presented to the medical class as illustrating a remarkable progress toward cure. He left the hospital in that month, and died in June, 1876, the subsequent history and the immediate cause of death not having been ascertained.

In the first of these two cases, complete rest was at no time enforced. He continued his business habits, which were pretty active, up to the sudden attack of dyspnœa five days before his death. The second patient, when the tumor appeared externally and appearances threatened rupture within a short period, took to the bed, and digitalis was given. Prior to this he was about the ward and hospital, sometimes availing himself of a pass to indulge in a debauch. It may be doubted if in either case the improvement could be attributed to medication. The first patient took the iodide of potassium in five grain doses only, for two months, and the second patient was treated sometimes with the iodide of potassium, sometimes with digitalis, and at times he took no remedies. The cases are introduced in proof that a spontaneous tendency toward cure may exist in some instances.

In the treatment of cases of aneurism, palliative measures are to be employed according to symptomatic indications. Pain often calls for opiates. Angina pectoris is sometimes incident to thoracic aneurism, and, of course, claims the treatment which is appropriate when it occurs in other connections. Remedies to improve appetite and digestion, if indicated, are important. If life be threatened by, or there be great suffering from, laryngeal spasm, either laryngotomy or tracheotomy may be advisable as a measure for palliation and the prolongation of life. With reference to this operation, it is important to distinguish the obstruction caused by compression of the trachea from that produced by spasmodic contraction at the glottis.

THROMBOSIS AND EMBOLISM.

Thrombosis and embolism, which have been referred to in connection with diseases already considered, will enter into the consideration of diseases of the digestive, nervous, and urinary systems. They are to be noticed here as pertaining to vessels which are not components of the organs embraced in the systems just named. To decide between thrombosis and embolism, is sometimes a diagnostic problem. This applies to the arteries and not to the veins; the latter are subject to thrombosis only. Obstruction of an artery by an embolus takes place suddenly, and by a thrombus more or less gradually. This is the rule, and it involves a differential point which probably in most instances is determinable. But there are exceptions to the rule. An embolus may occasion partial obstruction which afterwards becomes complete from the embolus serving as a nucleus for a thrombus. In such a case, thrombosis and embolism are united, and a thrombus may form so rapidly that the symptoms appear to denote embolism. The associated circumstances often afford aid in solving the problem. Coexisting heart-lesions render embolism probable, or a known venous thrombosis preceding symptoms which denote embolism of the pulmonary artery or its branches.

Thrombosis of Veins.

Thrombosis of the femoral or iliac vein is the pathological condition in phlegmasia dolens, so called, or the "milk leg," occurring after confinement. Obstruction of the same veins, producing essentially the same effects, occurs in other connections, namely, sometimes in typhus or typhoid fever, in phthisis, and other diseases which require long-continued rest, and in which the circulation and nutrition are enfeebled. This is known as marasmic thrombosis. It is recognized by œdema confined to one limb, with perhaps more or less of apparent venous congestion. The two limbs may be affected consecutively but never simultaneously. Recovery takes place when the circulation is established through collateral branches, or through the thrombus by canalization. Local treatment by gentle friction, bandages, etc., may do something toward expediting the circulation through anastomosing veins. Caution, however, is to be exercised in manipulations for this object, lest the thrombus, or portions of it, be moved onward in the direction of the current and give rise to pulmonary embolism.

If the thrombus obstruct the femoral vein near Poupart's ligament, the pressure upon the nerves occasions severe pain; otherwise, pain is wanting. In puerperal phlegmasia dolens, pain exists in only a certain proportion of cases, not constantly as the term dolens would imply. Venous thrombosis is not followed by gangrene unless from the co-operation of other causes, for example, erysipelas.

THROMBOSIS AND EMBOLISM OF ARTERIES.

Arterial trunks not components of visceral organs, are rarely the seat of thrombi excepting as a result of mechanical pressure or calcareous degeneration. Irrespective of these causes, whenever it is a question whether obstruction of any artery of considerable size be due to either a thrombus or an embolus, the probabilities are greatly in favor of the latter.

EMBOLISM OF THE PULMONARY ARTERY.

This is one of the causes of sudden death. A mass of coagulated blood, extending backward more or less within the inferior vena cava, in a case of thrombosis of the iliac or femoral vein, becoming detached, carried by the venous current to the right side of the heart, thence driven into the pulmonary artery, may obstruct this vessel, thus cutting off the supply of blood to the lungs directly, and, indirectly, to the nervous centres. Death takes place very speedily. The diagnostic symptoms are intense anguish from dyspnœa occurring suddenly with lividity, the pulse becoming at once feeble and quickly extinct. The suffering is from a sense of the want of breath, although air enters the lungs freely; in reality the want of blood in the pulmonary organs occasions the dyspnœa. The respirations are rapid and violent, but the arrest of the flow of blood to the nervous centres in a few moments, or even seconds, abolishes consciousness and destroys life. Embolism of the pulmonary artery causing sudden death, is an accident sometimes incident to phlegmasia dolens in puerperal cases.[1] The obstruction from the embolus is not always complete, or the embolus may be quickly broken into fragments which are carried into the branches of the pulmonic artery, giving rise to infarctus or embolic pneumonia, from which the patient may recover.

The embolus may be a coagulum formed in the right side of the heart. This is to be inferred when the obstruction of the pulmonary artery is not preceded by venous thrombosis. The author has met with a case of acute articular rheumatism in which sudden death was produced in this way, the autopsy showing complete occlusion of the artery by a dark, recently formed clot.[2] The diagnosis of sudden death from obstruction of the pulmonary artery by a clot formed in the right ventricle or auricle, can rarely be made with certainty, even with the advantage of witnessing the symptoms preceding death. The symptoms are analogous when death is attributable to paralysis of the right side of the heart from distension; but death from the latter cause is not as sudden as from complete obstruction of the pulmonary artery.

The rational indication for treatment in embolism of the pulmonary artery, is to excite the action of the heart in order that the blood propelled by the right ventricle may push the embolus onward or break it into fragments which will pass into the branches of the artery.

---

[1] For illustrative cases, *vide* Clinical Lectures on the Puerperal Diseases, by Prof. Fordyce Barker, M.D., 1874.

[2] For a typical case, with the autopsy, reported by Dr. Isaac G. Porter, *vide* American Jour. of Med. Sciences, October, 1876. *Vide* Boston Med. and Surg. Journal, January 25, 1877.

Embolism producing complete obstruction of one of the primary divisions of the pulmonary artery, is not a fatal accident; it may be tolerated indefinitely. The author has met with two instances. In one the left primary division was completely plugged by a calcareous mass which had evidently not recently lodged there. The immediate cause of death in this instance was pericarditis with large effusion. In the other instance the patient died with phthisis, and the autopsy showed a calcareous plug so firmly fixed in the right primary division that it could not be removed without dividing the coats of the vessel. Nothing appeared in the history to indicate when the obstruction took place. The embolus was a fragment of a calcareous formation in the right ventricle, and the latter presented the appearance of a portion having been detached by fracture.

EMBOLISM OF ARTERIAL TRUNKS OF THE SYSTEMIC CIRCULATION.

An embolus derived from the heart or from within an aneurismal sac, may cause obstruction, complete or incomplete, of arterial trunks belonging to the greater or systemic circulation. Reference has been made in the observations preliminary to this section, to a case in which the innominate artery and the left subclavian were completely obstructed, obstruction also of the left carotid being nearly complete. In a case under the author's observation, the patient, a woman about forty years of age, having had mitral obstructive lesions for over ten years, sudden and nearly complete obstruction simultaneously of the lower limbs took place, followed by cadaveric coldness and slowly developed gangrene of the feet. An autopsy was not practicable, but the seat of the embolism must have been the aorta, unless it be supposed that two emboli left the heart together, their course diverging at the aortic bifurcation. Obstruction of the iliac or the femoral artery on one side by an embolus, is an occasional event. It occurred in the case of Valentine Mott. The author has met with complete embolic obstruction of the axillary artery on one side, in a case of rheumatic endocarditis. Embolism of an arterial trunk which supplies blood to one of the members, is indicated by the sudden occurrence of obstruction, accompanied usually by intense pain referred to the limb supplied by the branches of the obstructed vessel. The character of the pain may at first appear to denote simply a neuralgic attack. The obstruction is shown by the suppression of pulsation of the arterial branches below the site of the embolus. The temperature in the limb falls; ischæmia is shown by notable pallor, and the muscular power is diminished. Unless the circulation be in a measure restored through anastomosing branches, gangrene follows.

Any treatment having for its object the removal of the embolus by absorption or solution is useless. The true object of treatment is to promote the re-establishment of the circulation through anastomosing branches. Very mild stimulating applications and gentle friction may contribute to this object; but active stimulation and forcible rubbing are hurtful. Heat should be applied with caution. The strength of the heart's action should be maintained by nutritious alimentation and tonic remedies.

SECTION THIRD.

DISEASES OF THE DIGESTIVE SYSTEM.

PRELIMINARY OBSERVATIONS.

Sources of information with reference to the diagnosis of diseases of the digestive system—Vomiting—Serous or watery vomiting—Vomiting of mucus, pus, blood—Treatment of hæmatemesis—Bilious and fecal vomiting—Vomiting of entozoa—Interstitial dejections—Lienteric, serous or watery, mucous, purulent, bloody dejections—Dejections containing portions of the intestinal tube—Pseudo-membranous and fatty dejections—Gall-stones in the dejections—Entozoa and foreign bodies—Absence, deficiency, and excess of bile in the dejections—Pain—Examination of the abdomen by inspection, mensuration, palpation, percussion, and auscultation—Abdominal tumors—Rectal alimentation.

THE sources of information with reference to the diagnosis of the diseases of the digestive system, are vomiting, the intestinal dejections, pain, and the physical exploration of the abdomen by inspection, mensuration, palpation, percussion, and auscultation. The preliminary observations will pertain chiefly to the diagnostic symptoms and signs derived from these sources. Some remarks on abdominal tumors and rectal alimentation will be added, the latter being an important measure in the treatment of certain of the diseases of the digestive system.

Vomiting.

Vomiting is an expulsion, wholly or in part, of the contents of the stomach by efforts more or less violent, which are usually involuntary. According to this definition, the ejection of liquid or solid matter in the act of eructation or belching, is not vomiting. Nor is this term properly applied to the removal of the contents of the stomach by efforts analogous to rumination. Some persons have naturally the ability to expel liquids and solids by a voluntary effort; and this ability may be acquired, as it was by the luxurious Romans in order thereby to prolong the gratification of taste and appetite. The ready return of milk from the stomach of infants can hardly be called vomiting; it is rather an overflow when the quantity ingested is superabundant, and is more physiological than pathological.

True vomiting differs much in different persons as regards the difficulty and violence of the act. In children, as a rule, it is easily excited and accomplished. Some persons throughout life vomit readily and with very little effort, whereas, others, as the expression is, "are hard to vomit," and the act is effected only by violent straining. This difference is to be considered in prescribing emetics for other objects than the expulsion of poisons from the stomach.

The diagnostic information derived from vomiting relates to its occurrence as a symptomatic event, together with circumstances attending the act, and to the matters which are ejected from the stomach.

Vomiting is a symptom common to various affections other than those of the digestive system. It is a frequent event at the commencement of the essential fevers. It is almost a constant primary symptom in cases of scarlet fever affecting children. It occurs often in different cerebral affections, namely, meningitis, tumors of the brain and functional vertigo. It is one of the symptoms of uræmia. It is common in the early stage of pregnancy. It accompanies the paroxysms of pertussis, and is of frequent occurrence, in connection with prolonged spasmodic cough, in cases of phthisis and bronchitis.

Of the diseases of the digestive system, it is by no means a symptom exclusively of those seated in the stomach. It enters into the clinical history of hepatic colic, and is not infrequently connected with enteritis, dysentery, and peritonitis. It attends the obstructive lesions of the intestinal canal. It is rarely wanting in the inflammatory and structural affections of the stomach. But when it proceeds from morbid conditions which are exclusively gastric, these are far from involving always either inflammation or lesions; they may be merely derangements of function, and intolerance by the stomach of food or drink constitutes a variety of purely functional disorder.

The circumstances attending the acts of vomiting vary according to the causative conditions. As a rule, vomiting which is symptomatic of inflammatory or structural affections of the stomach, is preceded and accompanied by very distressing nausea, and frequently by pain referred to the gastric region. In acute inflammation, the acts of vomiting occasion great pain. On the other hand, when vomiting is attributable to the sympathetic relations of the stomach with other organs, or when it is incident to a general disease, these associated local symptoms are less marked, and they may be wanting. Another point of distinction, applicable also to vomiting due to functional disorder limited to the stomach, as well as to inflammation and lesions, is that, under these circumstances, it is generally excited by ingesta, whereas, occurring in other connections, it may take place irrespective of the introduction of food or drink.

An examination of the matters ejected from the stomach is often of much importance in diagnosis. If vomiting take place directly or very shortly after the ingestion of food, the latter is found to have undergone little or no change. If a longer time have elapsed, the food generally shows changes caused either by the digestive process within the stomach or chemical, that is, fermentative or putrefactive, changes, the latter denoting that the digestive function is impaired or lost. Certain articles of food not easily affected by chemical actions, sometimes remain for a considerable period in the stomach without much change. In a case recently under observation, asparagus, which had been swallowed without mastication, was vomited forty-three hours afterward, scarcely altered in appearance. Milk, if vomited after having remained in the stomach but a short time, should be curdled. It is a popular idea that this is abnormal. The formation of a solid and compact mass by the action of the gastric juice, if not abnormal, is undesirable when digestion is enfeebled, and it may be prevented by the addition to the milk of lime-water in the proportion of a third or a quarter of the quantity taken. In cases of mechanical impediment to the passage of the contents of the stomach into the duodenum, the ingesta sometimes accumulate, and an immense quantity of aliment which has undergone changes partly by digestion, and in part by fermentation or putrefaction, is expelled by vomiting. The diagnosis of pyloric obstruction is based on the retention of food for several days and its expulsion by vomiting, together with the physical evidence of distension or dilatation of the stomach.

Aside from the alimentary contents of the stomach, there are various matters vomited which are important in diagnosis. These are, a serous or watery liquid in more or less abundance, mucus, pus, blood, bile, feces, and entozoa.

Serous or Watery Vomiting. Vomiting of Mucus and Pus.

The symptom known as pyrosis or water-brash falls in this division. A thin liquid is expelled in some cases by regurgitation only, but generally with vomiting, when the stomach is empty as regards ingesta, and especially in the morning; the liquid is either alkaline and brackish to the taste, or acid; the quantity is sometimes small, and sometimes considerable. Bismuth, given in full doses, that is, from a scruple to half a drachm, in most cases promptly relieves this symptom.

Another form is a copious vomiting of a serous or muco-serous liquid, the quantity much exceeding the amount of fluid ingested; the acts of vomiting are perhaps accompanied with but little nausea, and they are apparently excited by the distension of the stomach. As the liquid under these circumstances is probably a transudation, the term gastrorrhœa denotes this form. The liquid often shows fermentation, and sometimes resembles in appearance new beer, or an infusion of malt (wort). It then contains the yeast plant (*torula cerevisiæ*), and it may contain the cryptogamic plant known as sarcina ventriculi. The latter is found in other vomited matters, and it is doubtful how much pathological importance belongs to it. Its presence, however, and the existence of fermentative processes should be regarded as indicating remedies for the destruction of vegetable parasitic productions. The sulphite of soda in doses of from one to two scruples is an efficient remedy for this object. The salicylic acid is perhaps equally efficient. The carbolic acid water is another efficacious remedy.

An abundance of mucus in the matters vomited is evidence of inflammation of the gastric mucous membrane (gastric catarrh). With some of the acts of vomiting little else than mucus may be expelled. The acts are preceded and accompanied by distressing nausea, together with a feeling as if the stomach were loaded, and the expulsion of its contents would give relief. This might be called gastric tenesmus. The mucus may be streaked or tinged with blood. Not infrequently with violent acts of vomiting, under any circumstances, mucus containing a little blood is expelled, the source of the slight hemorrhage being the pharynx.

The vomiting of pus in large or considerable quantity, is evidence that a purulent collection has by ulceration made its way into the stomach.

Most frequently the pus is from an hepatic abscess. The author has met with a case in which an abscess of the liver opened first into the stomach, and afterward, externally. After the latter opening, milk when swallowed made its appearance at once at the external opening. Death took place from inanition. Abscess of the spleen, which is of very rare occurrence, has been known to open into the stomach.

In less quantity the pus denotes ulceration of the stomach or the œsophagus. In general, an ulcerated surface which furnishes an appreciable quantity of purulent matter, that is, appreciable to the naked eye, is connected with cancer. The round or perforating gastric ulcer furnishes little if any pus, and the latter is not observed without the aid of the microscope. Simple inflammation of the gastric mucous membrane, either acute or chronic, rarely, if ever, is accompanied by the vomiting of purulent matter. A rapid expectoration of pus from a pulmonary abscess, or when pyothorax leads to perforation of lung, may be accompanied by vomiting, and more or less of the pus which is swallowed may be afterwards vomited. The physical signs obtained by auscultation and percussion will point to the source of the purulent collection in these cases.

Vomiting of Blood. Hæmatemesis.

The term hæmatemesis signifies vomiting of blood, and, if the stomach be the seat of hemorrhage, the proper term, whether the blood be vomited or not, is gastrorrhagia. Blood which is vomited may be derived from an anuerism which has opened into the stomach. Hæmatemesis, but not gastrorrhagia, exists in such a case. When blood is vomited quickly, that is, without remaining in the stomach, if the hemorrhage be arterial, the color may be bright red. In most cases the blood accumulates in the stomach, and, before vomiting ensues, it is acted upon by the gastric fluids which render it extremely dark or quite black in color; hence the name "black vomit" which has been used to designate yellow fever. In this and in other affections it often presents an appearance like coffee-grounds. The quantity vomited in different cases varies from an amount so small as to be discoverable only by means of the microscope, to several pounds.

Hæmatemesis is to be discriminated from hæmoptysis. The differential points have been already stated (*vide* page 64). With the opportunity for observation at the time of the hemorrhage, there is not much difficulty in making this discrimination; but it is not always easy when the physician has to rely on the account given by the patient or others, especially if the hemorrhage have not been of recent date. Under these circumstances, the associated symptoms are to be taken into consideration.

The diagnostic significance of vomiting of blood is various. It is a symptom in cases of yellow fever, relapsing fever, and acute yellow atrophy of the liver. It belongs among the diagnostic events incident to the clinical history of these diseases. It occurs in connection with scorbutus and purpura hæmorrhagica. It is an important event in the history of cirrhosis of the liver, occurring in some cases without hydroperitoneum. It enters into the diagnosis of each of these affections.

Of gastric diseases, it is a symptom of acute gastritis, occurring in the latter stage of this affection. It is more important, in a diagnostic point of view, in cases of carcinoma and ulcer of the stomach, especially the latter. In carcinoma the hemorrhage is rarely large, but in ulcer it is not infrequently copious, and may prove the immediate cause of death. Its significance, taken in connection with other symptoms, in the latter affection, is such that, as advised by Brinton, the microscope should sometimes be resorted to in order to determine whether blood-corpuscles be present, but too sparingly to cause an appearance appreciable to the naked eye.

It should be borne in mind with reference to diagnosis, that hæmatemesis may occur independently of any other evidence of gastric disease. In some rare instances it appears to be supplementary to menstruation, and it is sometimes incident to pregnancy. Irrespective of these connections, it occurs when it is to be considered as purely functional and idiopathic; in other words, it is neither preceded nor accompanied nor followed by symptoms denoting disease of the stomach or elsewhere. A case which came under observation in 1874, was a striking illustration of this fact. A young man apparently in perfect health, while crossing the East River in a ferry boat, became faint and unconscious. In a short time his consciousness returned and he vomited a large quantity of blood. He recovered from the attack, having had no other symptoms than those arising from the loss of blood, and a thorough examination failed to discover evidence of disease anywhere. Two years afterward he had remained in perfect health. He had once previously had a similar attack. He had formerly been subject to epistaxis. Several instances of hæmatemesis less marked, but occurring independently of its usual pathological connections, and not followed by any serious consequences, have fallen under the author's observation. Chambers cites similar instances.[1]

Treatment of Hæmatemesis.

The immediate objects in the treatment of hæmatemesis are the arrest of the hemorrhage and the prevention of its recurrence. The indications for these objects, of course, are urgent in proportion as the hemorrhage is profuse and the danger therefore great.

Recumbency and absolute rest are to be enjoined. The peristaltic movements of the stomach should be arrested by opiates. The hypodermic method of administration is probably to be preferred. The stomach should be relieved of the function of digestion, by resorting to rectal administration, until the hemorrhage has ceased and the danger of its recurrence appears to have passed; this period may be days or weeks. If alcoholic stimulants be indicated they should be given per enema. The introduction of styptics into the stomach is of doubtful propriety. If they excite vomiting they will do harm. If not hurtful, it is not certain that they are of use. Ergotin may be administered hypodermically. Leube advises an injection of fifteen drops of a solution of one part of ergotin to ten of water. This may be repeated several times daily if required.[2] Ice may be swallowed in small pieces *ad libitum*. Cold may be applied to the epigastrium by means of compresses dipped in ice-water and renewed every few minutes, or the ice bag. Sinapisms applied to different parts of the body are of some benefit.

After the danger of a recurrence of the hemorrhage appears to have passed, caution with regard to the introduction of food into the stomach is advisable. The articles of diet at first selected should be those which are digested in the intestinal canal, that is, the farinaceous articles. If the patient have escaped great danger from the loss of blood, it is a judicious precaution to continue to nourish by the rectum for some time.

---

[1] The Indigestions, etc., by Thomas King Chambers, Am. edition, 1870.

[2] Ziemssen's Cyclopædia, Am. ed. vol. vii. p. 290.

The treatment of the different affections of which hæmatemesis is a symptom, will enter into the consideration of these affections in their proper nosological relations.

Bilious and Fecal Vomiting. Vomiting of Entozoa.

Whenever vomiting persists after the contents of the stomach have been ejected, bile is likely to be expelled in greater or less quantity. This regurgitation from the duodenum into the stomach is apparently an effect of the persistent vomiting; but probably the presence of bile in the stomach tends to keep up the vomiting. Bile is recognized by its yellow or greenish color, and by the bitter taste. The popular notion is that it denotes "biliousness," and that the more expelled the better. In reality, its presence in matters vomited only shows that the secretion is going on, and that there is no obstruction to its passage from the liver or gall-bladder into the duodenum.

It is customary to consider vomiting fecal or stercoraceous whenever the matters ejected emit the odor of feces. This, however, is not a criterion. The contents of the small intestine regurgitating into the stomach and expelled by acts of vomiting, may have this odor. True fecal vomiting, that is, the ejection of the contents of the large intestine, is extremely rare, if, indeed, it ever occur without a fistulous communication between the stomach and colon. The ileo-cæcal valve offers a stronger resistance to distension of the large intestine, before and after death, than the intestinal walls. This is shown by distending the colon in the cadaver with liquid under a pressure inward until rupture takes place. It was shown by a case under the author's observation of obstruction of the descending colon by a cancerous tumor. The ileocæcal valve in this case remained intact, the walls of the cæcum giving way, and death being caused by peritonitis from the escape into the peritoneum of the intestinal contents. The matter vomited and that passed from the bowels, may be identical in appearance and odor. This was true of a case which the author observed with two medical friends. There were vomiting and purging in this case, and the matters expelled by the two acts were preserved in different vessels. They were apparently identical. The diagnosis, in which all agreed, was a communication between the stomach and colon. The autopsy, however, showed no such communication, and no appearance of insufficiency of the ileocæcal valve. The subsequent conclusion was, that the matters purged and vomited were the contents of the small intestine. The so-called fecal vomiting in cases of obstruction of the large intestine, and in some cases of functional disorder, denotes generally, if not invariably, a regurgitation of the intestinal contents not extending below the ileum. As thus considered, it is a symptom of importance in certain affections which are to be considered in this section.

The lumbricoid worm is not infrequently vomited. The presence o the worm in the stomach does not occasion the vomiting, but is a result of the latter, owing to its causing regurgitation of the contents of the small intestine. This parasite, however, sometimes migrates into the stomach and may even ascend the œsophagus to the pharynx without occasioning vomiting.

Segments of tænia are sometimes vomited. This is extremely rare. The explanation is the same as that stated in relation to lumbrici.

Hydatids may be found in matters vomited. Generally they are developed within the liver, and discharged through an ulcerated opening into the stomach.

Intestinal Dejections.

Inquiries in regard to the function of defecation enter into the examination of patients whatever may be the seat and nature of the disease. Insufficient evacuations will be considered in connection with constipation, and, on the other hand, loose and morbidly frequent evacuations will be considered in connection with diarrhœa. The preliminary topics claiming attention are the more important deviations from the normal characters of the intestinal dejections.

It is essential in certain diseases to examine carefully the dejections. In many diseases this is not important; it may be omitted without any neglect of data bearing on diagnosis and treatment. It is a traditional custom for physicians always to inspect the feces. Patients may think that they have not received due attention if it be not done. Undue importance has been heretofore attached by physicians themselves to this source of information, and hence, the popular notion that to overlook it is a dereliction of duty. It is desirable that patients should not expect, as a matter of course, a daily inspection of the intestinal dejections. The physician, therefore, should state when it is, and when it is not, important that every stool should be preserved for his examination. It is not only disagreeable, but humiliating, to be expected to examine chamber-pots when there is no reason to suppose that any important information is to be derived therefrom.

Of the morbid characters pertaining to dejections, those which are of importance in diagnosis may be classified as follows: the presence of undigested food (lienteric dejections), serum or water in greater or less quantity, pus, blood, portions of intestine, fibrinous exudation, fat, gall-stones, entozoa, foreign bodies, and either the absence, a deficiency, or an excess of bile.

Lienteric, Serous or Watery, and Mucous Dejections.

Certain articles of food, either swallowed without mastication or not easily digested, may appear in the dejections, and, if they have occasioned no apparent disturbance, their appearance may be of little importance. Of course, if a person habitually inspect the passages from the bowels, and is thereby led to observe that certain articles are apt to be passed undigested, it is a rational indication either to eliminate the articles from the diet list, or indulge in them more sparingly. Transient lienteric dejections in children, with little, if any, disturbance, are common.

Intestinal indigestion is a frequent cause of attacks of colic and diarrhœa. Proceeding from this cause they are called crapulous. If the evacuations were examined with attention, they would probably always be found to be lienteric after these attacks. An examination, however, is hardly essential with reference to diagnosis or treatment.

A practical injunction in connection with these attacks is, not to consider them as necessarily indicating the importance of making radical changes in diet. A great variety of circumstances may suspend or impair the digestion of a particular meal, irrespective of any excess in the quantity, or error as regards the kind of food taken. Excesses and errors in these regards may account for indigestion in certain instances, but it would be easy to name a considerable number of causes, mental and corporeal, which are wholly independent of the quantity and the kind of food taken; hence, the same articles of diet which on one day are fully and easily digested, on the following day may be undigested.

Persistent or habitual lienteric dejections with more or less disturbance, which is equivalent to saying, persistent or habitual indigestion leading to looseness with colic pains, imply either defect in the quantity or quality of the digestive fluids, or dietetic causes which may relate to the quantity or quality of food. The diagnostic points and therapeutical indications will enter into the consideration of indigestion, intestinal colic, and diarrhœa, which are reckoned among the functional affections of the digestive system.

The passage from the bowels of a serous or watery liquid in greater or less abundance, is evidence of intestinal transudation. Epidemic cholera affords an illustration of a pernicious extreme of this pathological event. Intestinal transudation is the most important of the symptomatic events of that disease, standing in a causative relation to many of its striking phenomena. It is an important element in cases of epidemic dysentery characterized by sero-sanguinolent dejections. It is a diagnostic feature, although rarely grave, in sporadic cholera. It enters more or less into the causation of the diarrhœa incident to intestinal indigestion. It is illustrated by the operation of the cathartics distinguished as hydragogues, of which elaterium is the most potential.

It is a therapeutical object in certain affections to produce watery dejections. Hydragogues are the most efficient remedies for the removal of dropsy, and for the elimination of noxious principles from the blood, especially in uræmia. They may be employed simply to diminish temporarily the quantity of circulating fluid, effecting depletion without spoliation of the blood.

Opium has an effect antagonistical to that of hydragogues. This drug prevents and arrests intestinal transudation. The certainty with which epidemic cholera is prevented, and the promptness with which often it is arrested thereby, are remarkable illustrations. The drug also promotes absorption of the liquid within the intestinal canal. This is evident when, under its use, the physical signs of the presence of liquid rapidly disappear, and the dejections become solid.

The presence of mucus in quantity sufficient for its recognition, is in most instances evidence of intestinal inflammation. In acute dysentery dejections may consist wholly of mucus either streaked or tinged with blood. Bloody mucus either separate from, or conjoined with, fecal matter, is pathognomonic of that disease. If the dejections consist of mucus alone, it comes from the lower part of the large intestine. If solid feces have a coating of mucus, it comes from the rectum. Mucus derived from the small intestine, becomes commingled with other intestinal contents, and is only evidenced by the viscid, ropy character of the dejections. In young children who do not expectorate, mucus in the dejections may be derived from the bronchial tubes, this morbid product undergoing no change from the action of the gastric and intestinal fluids.

Purulent Dejections.

Pus is sometimes passed from the bowels in considerable or large quantity. This is evidence that an abscess has opened at some point within the intestinal canal. An abscess of the liver may have opened into the colon. The pus in pelvic cellulitis may be discharged into the rectum. Suppuration taking place around the rectum (periproctitis), may lead to an opening and the discharge of pus near the anus. Other sources of dejections consisting largely or entirely of pus, are perityphlitic and perinephritic abscesses.

In less quantity, mixed with mucus, and not infrequently with blood, together with more or less of serum and fecal matter, the presence of pus denotes chronic inflammation or ulceration of the mucous membrane of the large intestine.

Bloody Dejections.

Exclusive of the rare instances in which an aneurism bursts into the intestinal canal, the presence of blood in the dejections is evidence of intestinal hemorrhage (enterorrhagia). In gastric hemorrhage a portion or perhaps all the blood which escapes into the stomach, may pass into the bowels; but its visible characters are mostly lost from the changes which take place during the passage through the intestinal canal, and the dejections have a black, tar-like appearance. The microscope may, however, show that the red corpuscles are not wholly destroyed. More or less of the same changes take place if the hemorrhage be in the upper part of the small intestine, especially if the quantity of blood which escapes be not large. In proportion as the blood passed from the bowels is but little changed, the inference is that the source of the hemorrhage is not far from the outlet. Blood wholly unchanged is from the lower part of the rectum. Hemorrhage in this situation is of frequent occurrence from hæmorrhoids and fissures. It is rarely copious. It follows straining at stool, and is generally accompanied by symptoms denoting disease of the rectum. Exploration with the touch and eye shows its source.

Exclusive of rectal affections, hemorrhage from the bowels proceeds from a variety of causes. It is a symptom in certain general diseases, namely, purpura, scorbutus, and yellow fever. It is an untoward accident in some cases of typhoid fever, being incident to the intestinal ulcerations which characterize that disease. It may be caused by dysenteric, tuberculous, and syphilitic ulcerations, and it enters into the sero-sanguinolent dejections which occur in some cases of epidemic dysentery. It is a not infrequent result of the portal congestion occasioned by cirrhosis of the liver. Embolism of the superior mesenteric artery is another cause. It may occur vicariously as a substitute for menstruation.

Intestinal hemorrhage occurs irrespective of the causes just named, and of any appreciable causation. In these instances it must be considered as constituting an idiopathic affection. The author has notes of a number of cases in which profuse hemorrhage could not be traced to any antecedent morbid condition. The cases of this kind which he has noted, ended in recovery.

The treatment of intestinal, is essentially the same as in cases of gastric, hemorrhage. The important measures are absolute quietude of body, arrest of the peristaltic movements by means of opium, and cold applications to the abdomen. The patient, while the hemorrhage continues, should take no more nourishment than is required for nutrition, and the nourishment should consist mainly of animal broths, these being digested in the stomach. Ergotine may be administered hypodermically.

The only sources of error in diagnosticating intestinal hemorrhage are, mistaking for the evidence of blood the dark colored dejections which follow the administration of iron or bismuth, and the voluntary admixture of blood in dejections by malingerers.

Dejections containing portions of the Intestinal Tube.

Portions of the intestinal tube appear in the dejections in some cases of invagination. The invaginated intestine is separated by the process of sloughing, and is discharged from the rectum. Cases have been reported in which several feet of intestine have been expelled.[1] The sloughing away of the invaginated portion of intestine, leaving the intestinal canal open, but perhaps contracted, is the method of spontaneous cure.

Pseudo-membranous Dejections.

Small pieces or flocculi of false membrane, sometimes in considerable abundance, are contained in the sero-sanguinolent dejections which characterize certain cases of acute dysentery. Larger pieces are sometimes discharged in cases of chronic dysentery, and are found to be adherent to the mucous membrane in examinations after death. Membranous casts of the intestinal tube, in some instances of considerable length, have been found in the dejections. These may present an appearance not unlike sections of the intestine. Occurring without the usual bloody mucus which is the diagnostic criterion of dysentery, they have been considered as characterizing a variety of intestinal inflammation distinguished as pseudo-membranous enteritis or colitis.[2] They consist chiefly, or entirely, of concrete mucus, little or no fibrin entering into their composition.

Fatty Dejections.

In complete digestion, the fat contained in food is emulsionized and absorbed. Various causes, however, may prevent the complete digestion of this alimentary principle, and the feces then present characters showing its presence. The dejections contain more or less fat when the bile fails to reach the intestinal canal. They are rendered fatty by the use of opium. The presence of fat as a constituent of the feces is not necessarily of importance; but it is otherwise when free fat or oil in considerable quantity passes from the bowels. This is known as fatty diarrhœa. The fat is usually liquid when passed, and has an extremely offensive odor. It solidifies when it becomes cold, acquiring the consistency of butter, beef tallow, or wax. The quantity passed daily varies from a few ounces to over a pound.

---

[1] *Vide* Principles and Practice of Medicine, by the author, for reference to cases reported by Professors Van Buren and Peaslee.

[2] *Vide* Dictionnaire de Diagnostic Médical, par Woillez, art. Entérite. *Vide*, also, article on "Membranous Enteritis," by Prof. Da Costa, in Am. Journ. of Med. Sciences, October, 1871, and article by Dr. Wm. M. Findley in ibid., January, 1875.

This rare variety of morbid dejections, if persistent, denotes disease of the pancreas, either alone or in combination with disease of the liver. Clinical facts establish these pathological connections. Inasmuch as recovery takes place in a small proportion of cases, it is a fair inference, either that fatty diarrhœa may be caused by an affection which is purely functional, or that the lesions are not incurable.

Cases have been reported in which recovery took place under the use of olive oil in large quantity. The use of alcoholics has been found to arrest the fatty stools. Measures to improve the general health and promote invigoration, constitute the most important part of the treatment.

Gall-stones in the Dejections.

Biliary calculi, formed in the gall-bladder and exceptionally within the liver, passing thence through the cystic or hepatic and the common duct into the duodenum, occasion pain which is intense in proportion to their size and shape. A paroxysm of pain thus produced is called hepatic colic. The distinctive features of the pain, together with other diagnostic symptoms, will be considered in connection with non-inflammatory affections of the digestive system characterized by pain. The proof that paroxysms of pain were due to the passage of gall-stones is the presence of these in the dejections. The calculi vary in size from that of a pea to a hickory-nut. If of considerable size, they are discovered readily by examining the feces. When small, they may escape detection if the examination be not made with care. The most effectual way of determining either their presence or absence, is to pass the feces, diluted with water, through a wire sieve.

A case was reported not long since in a medical journal in which, during the treatment with olive oil in large quantity, the patient passed a large number of solid bodies, varying in size, which were supposed to be biliary calculi. They were presented as such, at a meeting of a medical society. A similar case has fallen under the author's observation. These bodies consist of concrete fat. True biliary calculi are to be discriminated from these, and also from concretions which may be formed within the intestinal canal. The form is sometimes distinctive. If the bodies be polyhedral, with smooth facets, either plane, convex, or concave, they are certainly gall-stones. Moreover, a calculus which has been passed having these appearances, is proof that the gall-bladder either contains or has contained other calculi. The passage of such a calculus with a first attack of hepatic colic, warrants the expectation that other attacks will occur sooner or later. If, on the other hand, bodies found in the dejections be round, oval, or irregular in shape, the proof of their being biliary calculi must be derived from their composition. They are sometimes composed of pure cholesterin. Generally, however, they consist of cholesterin and the coloring matter of bile, together with the carbonate and phosphate of lime. They may consist almost entirely of bile pigment.

Entozoa in the Dejections.

Intestinal worms are considered as constituting different affections of the digestive system, and as such, their diagnosis and treatment will receive attention in the section which follows. It will suffice to enumerate here the entozoa found in the dejections.

Various infusorial animals have been found in the dejections when examined microscopically. Their pathological importance remains to be ascertained. When found in mucus, or associated with diarrhœa and other symptoms of intestinal disorder, their causative agency is questionable. Their production may depend on certain morbid conditions, or their presence may be accidental and innocuous.

The intestinal entozoa which appear in the dejections, are the round worm (Ascaris lumbricoides), the thread-worm (Oxyuris vermicularis), and the tapeworms (Tænia solium, T. saginata vel medio canellata, T. elliptica vel cucumerina, T. flavo punctata, T. nana, T. madagasconensis, and T. bothriocephalus latus).[1] These are named in the order of the relative frequency of their occurrence.

The presence of these worms in the intestinal canal may be determined by finding their ova in the dejections. These are discovered by means of the microscope, and, it is stated that they are readily distinguished as belonging to the different species of animals.

Intestinal worms other than those already named, which may be found in the dejections, are the whip-worm (Tricocephalus dispar), and the Anchylostomum duodenale. The presence of both these worms in the intestinal canal may be determined by the presence of their ova in the dejections.

Among the many vagaries embraced in mental pathology, is an attempt to deceive by representing that animals which are not entozoa have passed with the dejections. Some time since, several specimens were brought to the author, of a worm several inches in length, known as the sand-worm and used by fishermen for bait, which a young woman, suffering from anomalous nervous symptoms, had exhibited to her physician as having been evacuated from the bowels. While writing these pages, a common maggot and a small insect belonging to the beetle tribe, were received as specimens of animals which a woman of high social standing claimed to have passed from the bowels in large numbers during several months. It is a common belief that animals may be taken in food or drink, or be developed from ova contained in the ingesta, and live indefinitely within the alimentary canal. Exclusive of the animals whose natural habitat is in this situation, the belief has no foundation in fact.

Foreign bodies in the Dejections.

Foreign bodies introduced into the mouth, such as coins, medals, buttons, pins, etc., are liable to be swallowed. This accident happens chiefly to infants and children, and is apt to occasion much apprehension. A foreign body which passes from the stomach into the intestinal canal, will be likely to pass through the latter without difficulty. If a body which has passed through the cardiac orifice fail to pass through the pylorus, it is because its length or form requires that in entering the orifice it should have a certain direction. A knife or a spoon, for example, may pass into the stomach readily, and become fixed transversely, when, if propelled endwise into the pyloric orifice, it would reach the intestinal canal. It may become fixed at some point in the tract of the intestine for the same reason; but this is less likely to occur than in the stomach. It is a mental relief to find foreign bodies in the dejections, when the fact of their having been swallowed is known. The dejections should be examined daily for this object.

---

[1] For descriptions of these different species of tapeworm, and the other intestinal entozoa, *vide* Heller's article in Ziemssen's Cyclopædia, Am. edition, vol. vii.

Foreign bodies with sharp edges or ends may wound or perforate the intestinal coats. To prevent this, and facilitate their passage, cathartics or laxatives are to be avoided, and the diet should leave a bulky fecal residue. The object is that the body may be carried onward impacted in solid feces.

Solid masses composed of indigestible constituents of food, such as seeds, husks, vegetable fibres, etc., are sometimes formed within the intestinal canal, and may acquire a size which occasions obstruction. Obstruction of the bowels from this and other causes will be considered among the diseases of the digestive system.

Absence, Deficiency, and Excess of Bile in the Dejections.

White or clay-colored dejections denote absence of bile. In cases of jaundice this appearance is evidence of complete obstruction to the passage of bile into the alimentary canal. The dejections may show the presence of bile, but in less than the normal quantity. The obstruction is then incomplete. The dejections, however, often show notable deficiency and sometimes almost an entire absence of bile pigment when jaundice does not exist, and when the urine gives no evidence of cholæmia. Under these circumstances, either the biliary secretion is diminished, or the bile pigment is entirely absorbed from the intestinal canal. The latter explanation is perhaps oftener applicable than is generally supposed. An effect of opium is often to render the stools notably free from the coloration attributed to bile. Considering that opium acts efficiently in promoting the absorption of other intestinal contents, it seems most rational to refer the deficiency of bile in the dejections to an increased absorption of it, rather than to a diminished biliary secretion.

The dejections in which bile is absent emit a fetor more offensive than that of healthy feces, and suggestive of putrefactive changes.

An excess of bile is shown by an abnormal intensity of the normal yellow or brownish color of the dejections. It prevents those changes which occasion the peculiarly offensive odor of putridity. The excess may be owing to hypersecretion or diminished absorption; probably the latter is the explanation in the larger proportion of cases. The greenish stools which are common in the intestinal disorders of children, do not denote an excess of bile; this coloration is due to the presence of hæmatin.

Pain.

The presence or the absence of pain, and its character, situation, etc., enter pretty largely into the diagnosis and treatment of diseases affecting the digestive system.

Of inflammations, those which are seated in the mucous membrane, whether chronic or acute, as a rule, rarely give rise to great intensity of pain. Inflammation of the stomach (gastritis) occasions a distressing sense of fulness and heaviness referable to the epigastrium, but not acutely painful sensations. Some of the cases in which the gastric inflammation is caused by irritant or corrosive poisons, are exceptions to this rule. The pain is dull, obscure, or absent in cases of inflammation seated in the small intestine (enteritis). Inflammation within the large intestine (colonitis, dysentery) gives rise to spasmodic or colic pains, called tormina; but these are rarely very severe. Within the rectum, the inflammatory condition causes a painful feeling of accumulation, with a desire to make efforts for defecation (tenesmus), and sometimes painful spasms of the rectal muscles are excited. Exclusive of these effects there is little or no pain.

It is otherwise in cases of inflammation of the peritoneal membrane. Acute diffused inflammation of this membrane (general peritonitis) is usually accompanied by pain which is more or less intense. The pain is burning and somewhat lancinating. It is increased by the tension of the abdominal muscles caused by extending the lower limbs, and hence the patient generally lies with the thighs flexed. The descent of the diaphragm in a deep inspiration increases the pain, and so also the propulsion of the gaseous and other intestinal contents by the peristaltic movements. Peritoneal inflammation limited to a portion of the membrane (circumscribed peritonitis), is generally accompanied by more or less pain. It is therefore a diagnostic symptom of perihepatitis, perisplenitis, perinephritis, and perityphlitis.

Of the structural affections of the alimentary canal, gastric ulcer is especially characterized by pain. A localized, circumscribed, gnawing pain, felt especially after the ingestion of food, and relieved when the contents of the stomach have either passed into the duodenum or been expelled by vomiting, is highly distinctive of that affection. Cancer of the stomach may be accompanied by the lancinating pains which are apt to attend carcinoma in other situations, but they are often wanting. Cancer in this situation is not infrequently painless, unless ulceration of the mucous membrane or circumscribed peritonitis have ensued, the pain then being due to these secondary affections. Ulcerations in the small or large intestine cause little or no pain except in the rectum; in the latter situation, especially if within the area of the sphincter muscle, the suffering during and after acts of defecation is very great. What was stated respecting pain in cancer of the stomach, is alike applicable to cancer of the intestines.

As a rule, inflammatory and structural affections of the solid viscera—liver, spleen, and pancreas—are painful only when they involve circumscribed peritonitis, the pain being due to the latter.

Certain of the non-inflammatory diseases are the most painful of those affecting the digestive system. These are, intestinal colic, the passage of gall-stones or hepatic colic, gastralgia, enteralgia, and lead colic. In treating of these affections, it will be convenient to group them as functional affections characterized by intense pain. The differential diagnostic points pertaining to this symptom, will then be considered. On the other hand, in one of the most fatal of diseases, namely, epidemic cholera, the vomiting and purging, which are the most important symptoms, are painless.

Examination of the Abdomen.

Information of value in diagnosis is obtained by inspection of the abdomen. Enlargement and its degree, or depression, are ascertained by this method of examination. If enlarged, the enlargement may be general and uniform; on the other hand, it may be disproportionably great on one side, or limited to a portion of the abdomen. These differences are apparent to the eye. In some instances of distension from tympanites, the abdominal walls being thin, the different parts of the intestinal tube may be recognized, and the peristaltic movements are visible. Inspection furnishes important information in discriminating from each other peritoneal dropsy, pregnancy, uterine tumors, distension of the bladder, ovarian tumor, dilatation of the stomach, increased volume of the liver, enlarged spleen, and fecal accumulation in the cæcum or other parts of the large intestine. The abdominal respiratory movements are diminished or arrested in certain diseases of the digestive system, especially in peritoneal inflammation, the costal movements being proportionably increased. Enlargement of the superficial veins of the abdomen denotes obstruction to the passage of blood through the liver. This is very marked in some cases of cirrhosis. The disproportionate size of the depending portion of the abdomen when the patient first lies on one and then on the other side, is evidence of the presence of liquid in the peritoneal sac, the liquid gravitating to the lowest part.

Mensuration may be employed to ascertain with exactness the circumference of the abdomen, and the variations in its volume at different periods. This is especially useful in cases of abdominal dropsy. In drawing conclusions from these variations, it is to be borne in mind that the volume of the abdomen varies considerably within physiological limits, according to the amount of ingesta and the quantity of gas in the stomach and intestines. The relatively greater size of the abdomen on either side, is ascertained by a semicircular measurement of both sides from the umbilicus to the spinal column.

Palpation is the most useful of the several methods of physical examination.

By means of the touch the absence or the presence and the degree of tenderness are ascertained. Tenderness may be superficial or deep-seated. It is superficial when slight pressure with the fingers causes pain, and deep-seated when only strong pressure is painful. In cases of inflammation of the mucous membrane of the intestines, light pressure is well borne, but an abnormal tenderness is ascertained by strong pressure. In acute peritonitis, on the other hand, light pressure is painful, but the degree of pain is proportionate to the force with which the pressure is made. In some cases of hyperæsthesia of the abdominal walls (dermalgia), the tenderness is extremely superficial; mere contact of the fingers occasions suffering, whereas firm pressure made with the palm of the hand may be well borne. The tenderness may be diffused or circumscribed. When circumscribed, its situation and limits denote the seat of disease. Localized tenderness is an important symptom in the diagnosis of affections of the liver, spleen, and cæcum. Pain and tenderness are by no means always associated; for example, in cases of gastralgia or enteralgia the severity of the pain is in a measure relieved by firm pressure. In the inflammatory affections pain is usually accompanied by tenderness, but the latter is sometimes marked when pain, irrespective of palpation, is wanting.

The sense of fluctuation is evidence of peritoneal or ovarian dropsy, and of the presence of pus and other liquid in various tumors. Next to the use of the exploring needle or trocar, the sense of fluctuation is to be relied upon in the diagnosis of hepatic, perinephritic, perityphlitic, and mural abscesses.

A sense of the friction of roughened surfaces (tactile fremitus) is sometimes felt in peritonitis, especially over the liver, caused by the movements of the diaphragm. The collision of calculi in the gall-bladder distended with liquid may sometimes be felt. The fact that a tumor felt at the lower margin of the liver is a distended gall-bladder may sometimes be shown by making pressure over it and thereby expelling its contents.

In determining enlargement of the solid viscera and the existence of tumors, together with their size and character, the chief reliance is on palpation. If a tumor be not too large, and the abdominal walls are thin, a tumor may be grasped by the hand, and in this way its size, its mobility or fixedness, its form, and its density are ascertained. If this method of examination be impracticable, the existence of the tumor is determined by the sense of resistance to pressure, and the space which it occupies by finding in every direction the point where this resistance ends. Not infrequently it is practicable to determine by the touch whether the surface of the enlarged organ or the tumor be smooth or nodulated. A liability to error is in mistaking tension of the abdominal muscles within a circumscribed space, especially the rectus muscle, for an abdominal tumor. This is the probable explanation of what have been called phantom tumors of the abdomen. A ready method of avoiding this error is to place the patient under the influence of chloroform or ether, when the so-called phantom tumor at once disappears. By the sense of resistance being continuous with the liver or spleen it is ascertained that tumors are connected with these organs. A diagnostic feature of enlargement of these organs, or of tumors connected with them, is their depression caused by the movement of the diaphragm in deep inspiration. This is determined by palpation. Mural tumors, if the abdominal walls be flaccid, may sometimes be diagnosticated by grasping them with the hand and passing the fingers between them and the viscera. In examinations with reference to the foregoing points, as much relaxation as possible of the walls of the abdomen should be secured by placing the patient in a semi-recumbent posture with the lower limbs raised, and requesting that the muscles should be made voluntarily flaccid.

Important information is obtained by percussion. Enlargement of the abdomen by gas is shown by a tympanitic resonance. The presence of a certain quantity of liquid in the peritoneal cavity is demonstrated by dulness or flatness from below upward for a greater or less height, when the patient is sitting or standing, and the substitution of tympanitic resonance when the patient is recumbent on the back. Another method of demonstrating the fact is to place the patient on one side and percuss the dependent portion of the abdomen while the body is in this position. If flatness be found, which disappears when the patient lies on the other side, and gives place to a tympanitic resonance, there is liquid in the peritoneal cavity. By the limitations of tympanitic resonance it is determined whether gas is present in the stomach, the large or the small intestine. A tympanitic resonance over a circumscribed tumor which is soft or fluctuating, denotes the presence of gas, probably derived from a communication with the intestinal canal. Gas pervading the subcutaneous areolar tissue of the abdomen, from perforation of intestine, may give rise to a diffused tympanitic resonance.

The lower border of an enlarged liver or spleen, and the boundaries of abdominal tumors, may be determined approximatively by finding a tympanitic resonance over the adjacent hollow viscera. This is not an accurate guide, because a tympanitic resonance is readily conducted for a certain distance by a solid body. To determine the boundaries of the space within which a sense of resistance is perceived by palpation, is much more reliable.

Percussion over a hydatid tumor may produce a sense of vibration or fremitus which is diagnostic, but not limited exclusively to that affection.

The information obtained by auscultation is comparatively meagre. A friction sound is sometimes heard in cases of general or circumscribed peritonitis, especially over the liver, caused by the rubbing together of the peritoneal surfaces roughened with lymph. The rubbing is caused by the movements of the diaphragm. The arrest of the intestinal peristaltic movements may be inferred from an entire absence of borborigmal sounds. Metallic tinkling or amphoric sounds are produced by the swallowing of liquid in cases of dilatation of the stomach. Auscultation is useful in determining that an enlargement of the abdomen is due to pregnancy, the evidence being the sounds of the fœtal heart; also, in determining the aneurismal character of an abdominal tumor.

Abdominal Tumors.

The diagnosis of abdominal tumors not infrequently involves doubt and liability to error. Their number is great and their character varied. A preliminary requirement is a knowledge of the numerous and diversified tumors which may be found. The more important are embraced in the following list: aneurismal, the diagnostic characters of which have been considered (*vide* page 242); cancer of stomach, liver, intestines, omentum, and mesentery; hepatic abscess; hydatids of liver; enlargement of pancreas from cancer or other affections; enlarged and dislocated spleen; dislodged or floating kidney; cancer of the kidney; ovarian enlargement; the uterus enlarged from pregnancy, fibroid and other morbid growths; distended bladder; sacculated bladder; nephritic abscess; perityphlitic abscess; fecal accumulation; concretions or foreign bodies in the intestinal canal (enteroliths); distended gall-bladder; extra-uterine fœtation.

The differential diagnosis of these, severally, with the exception of the tumors peculiar to women, will be considered in connection with the digestive and the urinary system.

Rectal Alimentation.

Life may be maintained for an indefinite period by means of aliment introduced into the rectum. In a case reported to the author by Dr. Charles Bliss, there seemed to be no reasonable ground for doubting that the patient, a feeble woman, much reduced by repeated attacks of hemorrhage and discharges of pus from the stomach and bowels, subsisted exclusively on nutritive injections for more than a year, and much of the time for the five subsequent years. Not only is life maintained, but improvement may take place with even a considerable gain in weight, while alimentary supplies are received only into the large intestine.

This method of alimentation is to be resorted to when, from obstructive affections of the œsophagus or the cardiac orifice of the stomach, food cannot be ingested in sufficient quantity to meet the requirements of assimilation, and when, from pyloric disease, the passage of the contents of the stomach into the duodenum is obstructed. As a measure of treatment, it is indicated when, from functional irritability, the stomach is intolerant of food, and when, in other affections, it is important to secure for the stomach complete rest, as in cases of ulcer, cancer, and gastric hemorrhage. Patients who are with difficulty made to swallow nutriment, owing to mental hebetude or coma, may be nourished by the rectum; and life may be prolonged by this measure in cases of invincible anorexia and loss of the digestive function within the stomach and small intestine from degeneration of the gastro-intestinal tubules.

The articles of diet which have been found adequate for rectal alimentation, are strong beef, mutton and chicken broths, milk and eggs. These different articles may be injected in alternation. A form of food proposed by Leube is called by him the "pancreatic meat emulsion," and is prepared as follows: from five to ten ounces of meat are chopped very finely, and one-third of this weight of finely minced pancreas (of the pig or ox), free from fat, added. This mixture is then rubbed up in a mortar with five ounces of lukewarm water, being reduced to the consistency of thick soup. This has been found well adapted for nourishment by the rectum. The article of diet known as "Leube's meat solution," is well suited for this object; but the time and care required for its preparation, are obstacles in the way of its ready availability.[1]

The quantity in each injection should not, as a rule, exceed four or six ounces. The injections may be repeated after intervals varying from two to six hours. Before commencing them, the contents of the large intestine should be removed by large simple enemata, and, if not contra-indicated by the feebleness of the patient, by an efficient laxative. If the bowels have not been fully evacuated, the nutritive injections at first will be likely to provoke fecal discharges. These after a time cease, and in some cases no dejections occur for days or even weeks, the patient not having any uncomfortable sensation of accumulation. If the repetition of the injections occasion irritability of the rectum, a few drops of laudanum should be added to the food injected. It is probable that the addition of pepsin promotes digestion within the large intestine. If the patient suffer from thirst, simple water may be injected from time to time, and the surface of the body sponged freely. It is often the case that water or pieces of ice may be taken into the stomach without harm, or with advantage, when either food is not tolerated, or the treatment requires that it be withheld from the stomach.

---

[1] For the method of preparing the "meat solution," *vide* Ziemssen's Cyclopædia, Am. edition, vol. xii., note preceding "Table of contents."

There may be advantages in the introduction of nourishment into the colon, instead of the rectum, by means of a flexible tube which generally may be carried up to the sigmoid flexure without difficulty. This is a point to be settled by clinical experience.

It is sometimes the case that nutritive injections are at first rejected, but retained after a few repetitions. To prevent their immediate expulsion, firm pressure should be made upon the anus by means of a sponge or napkin until the desire for their expulsion ceases. The injections should be warm. It is recommended by Leube to wash out the rectum by a simple enema before each administration of nutriment. This is unnecessary. The author has known the nutritive injections to be continued for two weeks without any dejection taking place, and without any inconvenience. The desire for food is fully satisfied by rectal alimentation, and in several cases under the author's observation, the patients have been reluctant to return to nourishment by the stomach.[1]

Dr. Andrew A. Smith has suggested defibrinated bullock's blood as an eligible form of rectal diet. He has made use of it in a considerable number of cases with satisfactory results. Other physicians in this city have reported favorably concerning it.[2]

---

[1] *Vide* article on Rectal Alimentation, by the author, in the American Practitioner, January, 1878.

[2] *Vide* paper by Dr. Smith entitled "Supplementary Rectal Alimentation, and especially by Defibrinated Blood, as applicable to a large range of cases in which nutritive enemata have not heretofore been employed," in the New York Archives of Medicine, vol. i. No. 2. 1879.

THE DIAGNOSIS AND TREATMENT OF DISEASES OF THE DIGESTIVE SYSTEM.

I.

DISEASES OF THE PHARYNX.

ACUTE PHARYNGITIS, SUBACUTE PHARYNGITIS, CHRONIC PHARYNGITIS, TONSILLITIS.

THE diseases of the pharynx, not less than those of the bladder and rectum, belong to surgery. It is customary, however, to consider certain of these diseases as medical rather than surgical. Pharyngitis, acute, subacute, or chronic, and tonsillitis are thus considered. Abscesses behind the pharyngeal membrane (retropharyngeal), syphilitic affections, and morbid growths are generally regarded as surgical. The diagnostic characters of pharyngitis and tonsillitis are readily ascertained, inasmuch as the affected parts are in most cases inspected without difficulty by placing the patient before a good light, with the mouth widely opened, and the tongue, if necessary, depressed by an instrument made for that purpose, the handle of a spoon, or some other convenient appliance.

ACUTE PHARYNGITIS.

Acute pharyngitis is a local complication in scarlatina, and sometimes in other essential fevers. Accompanied by a pseudo-membranous exudation, it is the anatomical characteristic of diphtheria which belongs among the general diseases. It is to be considered here as a primary local inflammation. It occurs sometimes in what is commonly called "a cold," being preceded by coryza and followed by bronchitis; it coexists with inflammation of the tonsils, but it also occurs as an isolated affection.

In acute simple pharyngitis the mucous membrane is intensely reddened and swollen. The redness and swelling may extend to the uvula and soft palate. There is a sense of an accumulation within the throat, which the patient strives to remove by swallowing or hawking. This might be called pharyngeal tenesmus. The acts of swallowing and hawking are painful. The uvula, if elongated and the soft palate relaxed, may provoke cough by contact with the top of the laryngeal space. An extension into the Eustachian tubes may occasion partial deafness. The symptomatic fever is moderate, the axillary temperature not rising above 101° or 102°. The average duration is from four to six days. The prognosis is always favorable. The chief danger is from the occurrence of œdema of the glottis. This is extremely rare. The author has met with a single instance.

The bowels should be moved freely by means of a saline purgative. The duration may perhaps be abridged by full doses of quinia. The discomfort may be alleviated by anodynes—morphia, Dover's powder, or codeia. Resolution is promoted by breathing warm vapor, and by fomentations applied to the neck externally. Stimulating gargles are contraindicated. This is true also of the topical applications of the nitrate of silver and other irritants by means of a sponge, mop, or brush. Sipping a mucilaginous liquid affords relief. Small pieces of ice may be taken into the mouth and swallowed, if the effect be grateful. Milk and eggs should constitute the food while the acts of deglutition are painful.

A more or less abundant secretion of sebaceous matter by the follicles, giving rise to a white or ash-colored deposit, constitutes a variety of acute pharyngitis. This variety has been called pultaceous pharyngitis. It is of importance chiefly from its liability to be confounded with diphtheritic pharyngitis. The appearances have a resemblance to those in the latter affection. The pultaceous deposit is generally transient; it is readily wiped away from the membrane, and it may be seen to dip into the follicular depressions on the tonsils. The discrimination is highly important with reference to prognosis, treatment, and the accumulation of data for therapeutical experience. This variety of acute pharyngitis is as benign as the ordinary form, and furnishes no additional indications for treatment.

Another variety is the occurrence of gangrene or sloughing. This is extremely rare. The author has met with a single instance of this variety.

SUBACUTE PHARYNGITIS.

Subacute pharyngeal inflammation is common, being either intermediate between a coryza and a bronchitis, or the point of departure in "a cold," but occurring also as an isolated affection. The appearances are the same in character as in the acute form, the redness and swelling being less marked. The local and general symptoms are proportionately less. In the majority of cases, patients do not consult a physician for this affection.

A mild saline laxative, moderate doses of quinia, and the chlorate of potassa given internally, constitute the treatment.

A follicular secretion, such as occurs in the pultaceous variety of acute pharyngitis, is not uncommon in the subacute form of the disease. It claims no special measures of treatment.

CHRONIC PHARYNGITIS.

Chronic pharyngitis is a very common affection in this country. It prevails especially among professional and business men, being comparatively rare among those belonging to what are called the laboring classes. It is much more common in men than in women. The affection is popularly known as "the catarrh." The pharyngeal mucous membrane is reddened, and the surface is sometimes smooth, but oftener irregular, having a granulated or mamillated appearance. Occasionally the surface is dry and shining. Small white spots are often visible over the tonsils, caused by accumulations within the follicles. These are liable to be mistaken for ulcerations. The latter are extremely rare. It is not uncommon to find the surface covered with viscid mucus. The inflammation may extend into the posterior nasal passages. There is no tendency to an extension into the larynx.

The local symptoms in different cases vary greatly. Some patients experience much annoyance from a sense of irritation, and feel an incessant desire to "clear the throat." In other cases there is hardly any consciousness of the affection. Coughing and hawking efforts in the morning, are sometimes required to remove the accumulations of mucus which take place during the night. Some patients fall into a habit of keeping up an almost incessant throat cough and hacking which are very annoying to others as well as to themselves. In order to avoid this habit, they should be instructed to refrain, as far as possible, from thinking of the throat, and to resist a disposition to cough and hack. Dulness of hearing may be caused by extension of the inflammation into the Eustachian tubes. Weakness of the voice and slight huskiness may be caused by long continued exercise of the vocal organs, but disappearing after a little rest.

The application of a strong solution of the nitrate of silver to the throat (thirty to sixty grains of the salt to an ounce of distilled water), applied by means of a camel's hair pencil brush, is sometimes useful, but oftener of no benefit, and the local symptoms are sometimes thereby increased. It may be tried and continued, or not, according to the effect. Tannin dissolved in glycerin is often useful. A little glycerin taken frequently upon the tongue relieves a sense of dryness. Demulcent troches have a soothing effect, and are especially useful when the voice is much used. Gargles are of very little benefit. The nasal douche is an effective means of freeing the posterior nares from an accumulation of mucus, and the irrigation is probably beneficial. Water holding in solution a little common salt may be used for this purpose. The patient should be cautioned against injecting liquids into the posterior nares. The author has met with an instance of inflammation of the internal ear thereby produced.

Internal remedies which may be given with reference to a curative effect are, the chlorate of potassa in doses of half an ounce of a saturated solution twice or thrice daily; the iodide of potassium from five to ten grains twice daily, and the hydrochlorate of ammonia in the same doses; Fowler's solution, four to five drops after each meal and continued without any increase of dose, and minute doses of the bichloride of mercury. As the affection is rebellious to medicinal treatment, the physician has often occasion to prescribe in succession the greater part or all of the foregoing list of remedies.

The success of treatment will depend much on measures addressed to the general health. The use of tobacco should be interdicted or greatly restricted. Alcoholics should be used only within sanitary limits. Quinia and the chalybeate tonics are often serviceable. For those engaged in sedentary pursuits, a fair proportion of time should be given to out-of-door life. A temporary change of climate, selecting one which is either warm or cold, but uniform and dry, may prove curative in obstinate cases. Invigorating hygienic measures, mental and physical, are more potential in effecting a cure than the use of drugs.

The author has never known a chronic pharyngitis to eventuate in laryngitis. He does not consider it important to enjoin rest of the vocal organs. They may be exercised to any extent if not productive of immediate discomfort.

The affection involves no tendency to the development of phthisis.

A variety of chronic pharyngitis claims a distinct notice. In this variety white concretions project from the follicles of the tonsils. It is analogous to acne, to which it has been compared. When the surface is thickly studded with these projecting bodies, the appearance is remarkable. The concretions are easily removed by means of a probe. In the cases which the author has observed, the patients have been young women. The application of a strong solution of the nitrate of silver is useful in this form of follicular pharyngitis.

Small round concretions formed within the follicles are sometimes expelled by acts of coughing, and are liable to be mistaken for pulmonary calculi. They differ from the latter in being unctuous to the touch, being crushed, not crumbled, by pressure, and in having a fetid odor.

It is highly important not to mistake for simple chronic pharyngitis syphilitic affections of the throat. The characteristic appearances of the latter are redness in patches, the color becoming livid, seated especially on the soft palate, and white patches caused by a thickening of the epithelium. Ulcerations should always excite a suspicion of syphilis, especially if seated on the soft palate, and when they show a tendency to extend and erode the tissues. In connection with the appearances, the previous history will establish the diagnosis.

TONSILLITIS.

Acute tonsillitis, or quinsy, is an inflammatory affection of the tonsils, ending generally in suppuration. The affection may be limited to one side, or both tonsils may be affected. The organs become much enlarged, and, if both be affected, they may come into contact with each other. The mucous membrane is reddened, and over the tonsils it may be covered with follicular secretion.

The affection gives rise to considerable pain. The efforts of deglutition are extremely painful, and the attempt to swallow liquids may cause their regurgitation through the nostrils. There may be considerable symptomatic fever, the axillary temperature rising to 102° or more.

The walls of the abscess rupture spontaneously within a period varying from two to four days. In rare cases this is delayed for ten days, or even longer. Directly the pus is discharged, the local and general symptoms subside, and, in general, quickly disappear.

When the sense of fluctuation is felt by the finger carried into the throat, the abscess may be opened and relief at once obtained. The abscess may sometimes be burst by pressure with the finger. Aside from the endeavor thus to anticipate a spontaneous rupture, the treatment embraces measures to promote suppuration, and to palliate the suffering of the patient. Suppuration is promoted by poultices or the hot-water dressing applied to the neck, and the inhalation of steam. The suffering may be mitigated by anodynes. Milk is the form of nourishment taken with the least inconvenience.

II.

DISEASES OF THE ŒSOPHAGUS.

SIMPLE inflammation of the œsophagus (œsophagitis), occurring irrespective of traumatic causes, namely, swallowing a quantity of some one of the mineral acids, other corrosive substances, or a boiling liquid, is one of the rarest of diseases. The diagnostic symptoms are a localized constant pain, and notable increase of the pain during the passage of food.

The œsophagus may be the seat of inflammation with exudation in cases of diphtheria. The false membrane, if expelled, has a ribbon-like form.

Ulceration and perforation may occur from the presence of a foreign body which, having been swallowed, becomes fixed at some point in the course of the canal. A striking example was a case at Bellevue Hospital, the patient having swallowed, during alcoholic coma, a set of false teeth which, being lodged in the œsophagus, led to perforation of the walls of the œsophagus and the pericardium. The foreign body was found partly within the œsophagus and partly within the pericardial cavity, death having been caused by acute pericarditis.

Perforation from without the walls may result from an abscess or the presence of a tumor.

A case of rupture of the œsophagus during violent efforts to expel a piece of meat which had lodged in the canal, has been reported by Prof. Fitz,[1] in an article which embraces the literature of the subject.

Obstruction may be caused by a foreign body, the pressure of an aneurismal or other tumor, an enlarged thyroid body, thickening of the walls, a morbid growth projecting within the canal, contraction from cicatrized ulceration and muscular spasm.

The foregoing affections belong to surgical, rather than to medical, practice. The last named condition involving obstruction, namely, spasmodic contraction of the œsophagus, is one which calls least for the manipulations of surgery. This may, in some cases, be diagnosticated and treated without the use of the probang. Functional spasm has been distinguished by the name œsophagismus. It is the cause of difficult deglutition (dysphagia) in some cases of hysteria. The sensation of a ball ascending from the stomach to the throat, or the globus hystericus, involves dysphagia dependent, probably, on œsophageal spasm. Fancied dysphagia is sometimes a hysterical delusion. Spasmodic contraction without inflammation or lesion, that is, functional, occurs in non-hysterical patients and in men as well as women. Examples, however, are rare. The following is an illustrative case:—

---

[1] *Vide* the Am. Jour. of Med. Sciences, Jan. 1877.

Mr. G., a middle aged, intelligent man, of a highly nervous temperament, complained of frequent inability to ingest food. Both food and drinks were regurgitated directly they passed below the pharynx. The regurgitation was sometimes so constant and complete for successive days, that he suffered from a sense of hunger and from inanition. The difficulty was variable in its recurrence and duration. At times food passed into the stomach without any evidence of obstruction. When regurgitation took place, the obstruction seemed to him to be situated at about the middle of the sternum. A probang had been repeatedly passed into the stomach without meeting with any obstruction. Whenever food entered the stomach it occasioned no inconvenience; he was free from dyspeptic ailments, and under the influence of small doses of morphia he was able to ingest food without any trouble. In all other respects than the evidence of œsophagismus he seemed to be well. He was not under observation long enough to test the efficacy of measures of treatment. Bismuth was prescribed in full doses, but with no benefit.[1]

Obstruction from spasm sometimes persists for a long period. The treatment consists in the frequent passage of the probang, or of œsophageal bougies. Passing the electric current through the tract of the œsophagus has been found effective.

Paralysis of the œsophagus, occurring without coma, and as an isolated affection, is extremely rare. The evidence of its existence is the accumulation of food within the canal, and the absence of any mechanical obstacle as determined by the probang or bougie. It denotes interference with the function of some of the fibres of the pneumogastric nerve, from the pressure of a tumor, or some other cause, either within or without the cranium. The appropriate measure of treatment is the local employment of electricity. The œsophagus may become involved in progressive general paralysis, in paralysis of the pharynx after diphtheria, and in labio-glossal or bulbar paralysis.

In cases of mechanical obstruction of the œsophagus from any of the causes which have been named, whenever life is endangered from inanition, or if the deficiency of ingesta be sufficient to occasion much suffering, rectal alimentation is to be resorted to. Should this method prove inadequate to avert death, either œsophagotomy or gastrotomy with a view to establish a fistulous opening into the stomach, remains as a last resort. A case has been reported in which the latter of these alternatives was successful.[2]

---

[1] For an account of a typical case in a young boy, reported by I. W. Hulke, *vide* Trans. Clinical Society of London, vol. VI. 1873.

[2] *Vide* N. Y. Med. Record, Nov. 25, 1876.

III.

DISEASES OF THE GLANDS OF THE NECK.

AROTIDITIS, GOITRE, DISEASES OF THE LYMPHATIC GLANDS, SCROFULA.

PAROTIDITIS.

INFLAMMATORY enlargement of the parotid gland, either on one side or on both sides, is the anatomical characteristic of a febrile disease, commonly known as mumps, which is communicable by means of a contagium probably contained in the expired breath. Its proper nosological place is among the contagious essential fevers. The susceptibility to the special cause diminishes after puberty, and hence, in the great majority of cases, patients are under this age. The disease, however, may affect persons at any period of life. After adult age, men are more susceptible than women.

The fever may precede the affection of the parotid for one, two, or three days, or the two may be coincident. The auricular portion of the gland is first enlarged, pushing outward the lower part of the ear. The swelling extends rapidly to the remainder of the gland. The degree of swelling is considerable, and, if both parotids be affected, the face inclosed within the two tumors presents a ludicrous aspect. The skin over the parotids may be either pale or slightly reddened. Increase of heat is apparent to the touch. The fever is often high, the axillary temperature rising to 103° or 104°. The usual concomitants of the febrile state are present. The patient experiences considerable pain in the tumors and ears, which is much increased by movements of the jaws.

The diagnosis of mumps involves no difficulty except in the exclusion of parotoditis occurring in other pathological connections. One or both of the parotid glands may become inflamed secondarily to inflammation within the mouth. Mercurial stomatitis is especially apt to have this effect. In typhus and typhoid fever, parotiditis is not a very infrequent complication, and it is an occasional event in the eruptive fevers, in pyæmia and in pneumonia. In these connections suppuration take place, as a rule, and frequently necrosis and sloughing of the tissu ensue. These consequences in mumps are extremely rare, the inflamm tion ending almost always by resolution.

Mumps is a self limited disease, the duration of the fever being fr three to five days. The glandular enlargement then begins to dimin and disappears after a few days. The period of incubation is about weeks.

Inflammation of one of the testes and sometimes of both (orchit an occasional concomitant or sequel. In the female the mammary the glands in the labia, and the ovaries are liable to become in These affections generally end in resolution. It is customary to c metastases of the parotiditis, and attributable to cold.

rational view is that they are due to the same internal cause which determines the primary local affection, that is, the parotiditis.

Expectant and palliative measures only are indicated in the treatment of mumps. Depletion by means of a saline purgative at the outset, affords relief. It is contraindicated by feebleness of the patient or weakness of the circulation. If the fever be high, full doses of quinine may be given for an anti-pyretic effect. Pain, restlessness, and vigilance call for anodynes. Fomentations to the neck have a soothing effect. Counter-irritation is not indicated. Owing to the pain and difficulty in mastication, milk, eggs, gruels, and animal broths should constitute the diet.

Parotiditis occurring in other connections should be treated by poultices with a view to promote suppuration and the separation of sloughs. An opening should be made as soon as fluctuation is felt. Supporting measures are generally indicated.

Goitre.

Enlargement of the thyroid body, bilateral or unilateral, constitutes the affection called goitre or bronchocele. As one of the physical deformities, associated with idiocy, which characterize cretinism, it has no practical interest for the medical practitioners of this country; nor is the author aware of the occurrence in any part of this country of goitre as an endemic disease. Sporadic cases are not very infrequent, the enlargement being either slight, moderate, or great. It occurs in women oftener than in men.

The only possible errors of diagnosis are to mistake for enlargement of the thyroid body, a tumor, malignant or benign, developed in its site, and in exophthalmic goitre, to infer from the strong arterial pulsation in some cases the existence of aneurism. These errors are easily avoided. The enlargement of the thyroid body in exophthalmic goitre, Graves's disease or Basedow's disease, is an element in the affection known by these names and included among the diseases of the circulatory system (*vide* page 234).

Enlargement of the thyroid body, when slight or moderate, is sometimes successfully treated with iodine. The iodide of potassium or of ammonium may be prescribed, or, if there be anæmia, the syrup of the iodide of iron is an eligible preparation. Trial should be made of this remedy, but it will succeed in only a certain proportion of cases. The local application of iodine, by means of the tincture or the ointment, should be conjoined with its internal use.

If the enlargement attain to great size, inconvenience, suffering, and danger may proceed from pressure upon the veins and the trachea. Under these circumstances the propriety of surgical interference by puncture, electrolysis, injections, and removal by the knife is to be considered.

Enlargement of the Lymphatic Glands, Scrofula.

Enlargement of the lymphatic glands or ganglions, due to inflammation, is expressed by the terms adenitis and lymphadenitis. The enlargement, however, may be due to hypertrophy or hyperplasia of the anatomical elements of the glands, not involving an inflammatory condition.

The important questions in diagnosis relate to the pathological significance of the glandular affections. Are they produced by local causes exclusively, or are they idiopathic? Are they secondary to local diseases, being caused by a morbific agency transmitted from the diseased part by means of intervening lymphatic vessels? Do they represent a general disease (dyscrasia, cachexia)?

Inflammatory enlargement may be produced, traumatically, by a local irritant or injury, and perhaps, sometimes, as an effect of exposure of the neck to cold. Instances, however, are rare. In some cases there is no cause discernible. Under these circumstances the affection must be considered as idiopathic. It is probable that in some of these cases the affection is secondary to local causes which escape observation, and which may be of transient duration, the glandular enlargement persisting after the causes have ceased to exist. Every physician meets with instances in which these glands are enlarged and remain so indefinitely, without recognizable causative conditions, and not accompanied by symptoms denoting a general disease. In such instances the enlargement is rarely great, suppuration takes place infrequently, and the local signs of inflammation are wanting. The practical precept is, that enlargement of these glands, when not referable to appreciable local causes, does not, as a matter of course, denote scrofula or any important general disease.

The lymphatic glands of the neck become enlarged secondarily in affections of the skin and throat. Examples are either scarlatinous or diphtheritic pharyngitis, and eczema or impetigo of the scalp. The local appearances may, or may not, denote adenitis, and suppuration may take place, but not as a rule. If not idiopathic nor traumatic, and if not secondary to a local disease affecting the glands through lymphatic connections, their enlargement is to be interpreted as signifying either leucocythemia, Hodgkin's disease, syphilis, or scrofula. The diagnostic characters of the first two of these diseases have been considered (*vide* pages 184 and 185). The consideration of syphilis is not embraced within the scope of this work. Suffice it to say that enlargement of the chain of lymphatic glands at the posterior part of the neck, is one of the points in evidence that there has been a syphilitic infection. It remains to notice the significance as pointing to scrofula.

The diagnostic characters of scrofulosis of the glands are derived from concomitant diseases and symptoms, together with the progress of the glandular affection. The concomitants are persistent eruptions on the face and head (eczema or impetigo), conjunctivitis and ulcerations of the cornea, persistent coryza, caries or necrosis of bones, especially of the vertebræ and in the neighborhood of joints, external suppurative otitis, a bloated and unhealthy aspect of the face, and undue prominence of the abdomen rendered more marked by thin extremities—these manifestations of a scrofulous disposition occurring in childhood or youth. A greater or less number of the glands may be affected. The enlargement generally is either moderate or considerable, but occasionally it is very great. The enlarged glands may remain indolent, without appearances denoting inflammation, for a variable period, extending in some cases to years.

Sometimes they slowly decrease in size, and at length resolution takes place. Oftener, however, the affected glands become inflamed; the inflammation slowly progresses; suppuration takes place, and a thin seropurulent liquid, containing cheesy particles and the detritus of the glandular tissues, is discharged. The discharge continues for a long period; destruction of the integument follows, leaving ulcers, and when these have healed there remain indelible, puckered, depressed cicatrices which are characteristic of the affection.

The treatment of scrofulosis of the glands is to be addressed chiefly to a pathological condition underlying the glandular affections, which is expressed by the terms dyscrasia and cachexia. That this condition is special in character, that is, peculiar as regards its causative connection with scrofulous and allied affections, may be logically inferred, but in what it essentially consists our present knowledge does not enable us to say. It is a rational indication to improve and invigorate the general health. For this end a nutritious diet, sufficiently abundant and varied, is essential. Remedies to increase appetite and the power of digestion are indicated if these be deficient. The bitter vegetable tonics, the mineral acids, and pepsin may be prescribed for these objects. Hygienic measures of regimen are, however, more efficient than drugs, and the latter cannot supersede the former. A proper amount of muscular exercise and of life in the open air are essential. Sea-bathing in the summer season, the tepid bath, and sponging the body with cool water followed by brisk friction, are important as invigorating measures and as maintaining the functions of the skin. If the residence be in a low, damp situation, a change is, if possible, to be made. Change of climate from one which is variable, humid, and rigorous, to one more uniform, dry, and genial, is desirable. The mental faculties should be exercised as one of the sanitary requirements, but not over-taxed, and the influence of recreation or play, if not too exciting, on the general health, is by no means inconsiderable. The clothing should be adjusted to the sense of comfort.

Medicinal agents which experience has shown to be useful are iodine, iron, the potassa salts, and cod-liver oil. Iodine in some cases seems to have a controlling influence over the glandular affection prior to the development of inflammation. The syrup of the iodide of iron has been long in use as peculiarly useful, and is to be recommended on the basis of experience. Other preparations of iron are useful, such as the tincture of the chloride or muriated tincture, the tartrate, and the dialyzed iron. The last-named preparation has the advantage of being easily administered to children. The muriated tincture is made palatable by combination with dilute phosphoric acid and the syrup of lemon or orange peel, the doses being diluted with a sufficient quantity of water. The phosphate of soda and of lime and the hypophosphites are useful remedies. Dilute phosphoric acid given with these, as recommended by Bartholow, renders them less disagreeable and increases their good effects. Cod-liver oil should enter into the treatment whenever it is taken without great repugnance or diminution of appetite, and when there is no evidence that it is not digested. Ether combined with the oil is supposed to promote its digestion by increasing the pancreatic secretion.

It would be going without the scope of this work to discuss the relationship existing between scrofula and phthisis. Connected with this topic is a question which has an important bearing on prognosis, namely, Are they especially prone to phthisis who in infancy or early life had a scrofulous affection of the cervical glands from which they have recovered? The author's experience has led led him to the conclusion that this question may be answered in the negative. In a large collection of cases of phthisis, the number of cases presenting the characteristic cicatrices of a scrofulous affection of the glands is small.[1]

IV.

INFLAMMATORY DISEASES OF THE STOMACH AND INTESTINES.

ACUTE GASTRITIS, ACUTE TOXICAL GASTRITIS, ACUTE ENTERITIS, ACUTE DYSENTERY, ACUTE TYPHLITIS, TREATMENT OF THESE DISEASES, PHLEGMONOUS INFLAMMATION OF THE STOMACH AND INTESTINES.

Acute inflammation never affects the entire gastric and intestinal mucous membrane. In the great majority of cases it is limited to one of different sections as follows: The stomach; the duodenum being frequently, if not generally, involved—acute gastritis. The small intestines—acute enteritis.[2] The large intestine—acute dysentery. The cæcum—acute cæcitis or typhlitis. These several affections will be considered, first, as regards their diagnostic characters, and, second, as regards therapeutical indications.

Acute Gastritis.

The term acute in this application has, at the present time, a wider scope than it had heretofore, at least with English authors. A gastritis formerly was considered as acute only when the general and local symptoms denoted a disease of great gravity, ending fatally in a large majority of cases. The affection, as thus restricted, is extremely rare, in most instances being traumatic, that is, caused by the direct action of corrosive or acrid poisons. At the present time, especially by French and German authors, the term acute gastritis has a much wider range, a large proportion of the cases being those in which, some years since, the inflammation would have been considered as subacute. The present use of the term is the more correct. A gastritis accompanied with more or less fever and other evidence of constitutional disturbance, the patient being obliged to keep the bed, is properly an acute affection. This more comprehensive sense of the term, of course, affects the prognosis and the frequency of the affection. It may be said now that, exclusive of toxic cases, acute gastritis generally ends in recovery, and that it is not of very infrequent occurrence. In this country it is met with especially among those addicted to the abuse of alcoholics. The term gastric fever is sometimes applied to cases of acute gastritis. This term is incorrect, inasmuch as the disease is a local inflammatory affection, and not an essential fever. There is properly no such disease as gastric fever in the nosology. When caused by corrosive or acrid poisons, the affection has certain distinguishing features, and claims distinct notice. Produced by other causes, the name by which it is designated in German and French literature is acute gastric catarrh. Here, as in other instances, the term catarrh is superfluous, and the name acute gastritis, in the opinion of the author, is much to be preferred.

---

[1] *Vide* Phthisis—its Morbid Anatomy, Etiology, Symptomatology, etc., by the author, 1876.

[2] German and French authors embrace under the name enteritis, inflammation of both the small and the large intestine.

The local symptoms which are diagnostic when taken in connection with the general symptoms are, persistent vomiting, with distressing nausea, a sense of weight or oppression, and more or less pain referred to the epigastrium; the matters vomited consisting of fluids which have been ingested, together with mucus which is sometimes bloody, and bile, the latter recognized by the bitter taste and either a yellow or greenish coloration; intolerance of the blandest liquids, and even water in any considerable quantity; anorexia with complete aversion to food; a distressing sense of thirst rendering it difficult for the patient to resist the desire to drink cold liquid, although painful acts of vomiting are thereby excited, and notable tenderness on pressure over the epigastrium.

The following are the prominent symptoms, other than those which are local: fever, the body-heat, probably as a rule, not greatly increased, the data for an exact statement on this point being wanting; prostration always considerable, and marked in proportion to the intensity of the inflammation; constipation when the affection is not due to a toxical cause; the pulse in severe cases, notably frequent, small and weak; mental depression, the faculties of the mind remaining intact; frontal headache, and frequently an herpetic eruption about the mouth.

Jaundice may occur in cases of acute gastritis, and is evidence that the inflammation extends to the duodenum.

It is hardly necessary to consider the differential points involved in discriminating acute gastritis from typhoid fever, for the local symptoms of the former are never presented in the latter disease. The gastric symptoms in some cases of remittent fever are suggestive of gastritis which may actually exist as a complication; but the general symptoms, the periodical exacerbations of fever, etc., are sufficient for the discrimination. Functional vomiting is excluded by the fever, the local pain and tenderness, the abundance of mucus in the matters vomited, and other symptoms denoting severity or gravity of the disease. Sporadic cholera is readily distinguished by the prominence of purging, and by other points of difference, this being a gastro-intestinal functional affection.

ACUTE TOXICAL GASTRITIS.

Acute gastritis caused by taking into. the stomach the acrid or corrosive poisons, such as the mineral acids, arsenic and corrosive sublimate, is distinguished by a greater intensity of pain referable to the stomach, the pain being of a burning character; by the more constant presence of blood in the matters vomited; by the visible effects of the poison within the mouth or pharynx, and by the frequent occurrence of diarrhœa. To these is to be added the sudden development of the gastric symptoms, whereas, in cases not thus produced, the development of the affection is generally gradual. Of course, the diagnosis is rendered certain by a knowledge of the fact that a poison has been taken; but information may be concealed if the poison have been taken with a suicidal intent, and the patient may not know the fact when taken by accident or given for homicidal object.

ACUTE ENTERITIS.

Simple acute inflammation of the mucous membrane of the small intestine (acute intestinal catarrh) is a rare affection after childhood. In infancy it is of frequent occurrence, and is associated often with inflammation within the large intestine (colo-enteritis). The latter is the affection in a certain proportion of the cases of cholera infantum, or, as it is popularly called in this country, "the summer complaint," from which infants are liable to suffer during primary dentition. In these cases, however, the inflammation is oftener subacute than acute.

The local diagnostic symptoms of acute enteritis are, a persistent, dull, aching pain referable to the abdomen around the umbilicus, the pain at times having the character of colic; tenderness on deep pressure in the same situation; diarrhœa, the dejections after the fecal contents of the large intestine have been evacuated, muco-serous in character, yellowish or greenish from the coloration of bile, and sometimes causing a scalding sensation in passing the anus. Diarrhœa is not a constant symptom, and there may be constipation. Within the last three years, the author has met with two cases in which, from the absence of diarrhœa, and the latency of the disease as regards other symptoms, the diagnosis was not made. In both cases the autopsy showed the characters of intense inflammation limited to the small intestine. The symptomatic fever, as a rule, is not high, and the concomitant symptoms denoting constitutional disturbance may be proportionately lacking severity. If not complicated with other affections, or itself a complication of an important disease, the tendency in most cases is to recovery, after a duration of from a week to a fortnight.

The affection is to be differentiated from dysentery, typhlitis, gastro-duodenitis, typhoid fever, and enteralgia. Dysentery is excluded by the absence of the characteristic muco-sanguinolent dejections and tenesmus. In typhlitis the local symptoms are distinctly referable to the situation of the cæcum. Gastro-duodenitis is distinguished by the prominence of vomiting together with other gastric symptoms, and by the occurrence of jaundice in a certain proportion of cases. The diagnostic points in the history of typhoid fever, namely, gradual development, epistaxis, tenderness in the iliac region, the rose-colored eruption, delirium, and mental hebetude, are wanting. Moreover, the progressive increase of the temperature of the body, and the general debility, early in the progress of the disease, are greater in most cases of typhoid fever. The intensity of pain and its paroxysmal character, taken in connection with the absence of fever, of diarrhœa, and of tenderness on pressure over the abdomen, sufficiently distinguish enteralgia.

Acute Dysentery.

The name dysentery is retained in the absence of an anatomical term which embraces the whole of the large intestine. This remark is also applicable to enteritis; there is no term which includes the jejunum and the ileum. As in the latter affection the inflammation is either limited to, or more marked in, the ileum, so in dysentery, the inflammation may be confined to the rectum and descending colon, or, it is greater in these portions if it extend over the whole of the large intestine. Acute dysentery is less infrequent than either acute enteritis or acute gastritis.

The dejections in acute dysentery are characteristic. Bloody mucus, either alone or commingled with fecal matter, is pathognomonic, when taken in connection with other symptoms. The inflammation of the rectum (proctitis, rectitis) occasions a distressing sensation of the presence of matter to be expelled, and induces painful straining efforts when there is nothing to be discharged but bloody mucus. This is tenesmus, which is also a characteristic symptom. The dejections are often preceded by griping pains, such as occur in colic, and this is the symptom called tormina.

In some cases, especially when the disease prevails as an epidemic, the dejections consist in a great measure of bloody liquid containing, in more or less abundance, flocculi of either lymph or concrete mucus. These are distinguished as sero-sanguinolent dejections. They may occur either with or without the discharge of masses of bloody mucus. They denote diffusion of the inflammation throughout the large intestine, and, if the quantity of liquid be great, an unusual gravity of the disease. Epidemic dysentery characterized by large sero-sanguinolent dejections, is popularly known as "the bloody flux."

The general symptoms vary much in different cases, more especially if the disease prevail as an epidemic. A considerable increase of the body heat, with full pulse and hot skin, is exceptional. In mild cases there is very little symptomatic fever. In so-called malignant dysentery, large sero-sanguinolent dejections occurring, the pulse becomes feeble, the skin is cool or cold, and the phenomena of the state of collapse may supervene, the mental faculties, exclusive of a few exceptional cases, remaining intact.

Acute dysentery can hardly be confounded with any other disease.

The only questions, as regards diagnosis, which arise in individual cases, are, whether it is associated with any disease, and if so, what are the coexisting affections.

ACUTE CÆCITIS OR TYPHLITIS.

Cases are occasionally met with in which acute inflammation is clearly localized in the cæcum. The local symptoms are pain and tenderness on pressure within a circumscribed area over this organ; and with these symptoms is associated a moderate degree of symptomatic fever. The distension of the cæcum from the presence of gas and fecal contents sometimes gives rise to a visible enlargement, and the form of this portion of the large intestine may be represented. Enteritis and dysentery are excluded by the absence of their diagnostic symptoms and the localization of the pain and tenderness. The difficulty in the diagnosis is the exclusion of perityphlitis, an affection which will be considered in another connection. This differential diagnosis is not at once easily made. It is to be based mainly on the absence of a tumor in the cæcal region, together with the local and general symptoms significant of suppuration. The error of mistaking for perityphlic phlegmonous inflammation a fecal accumulation within the cæcum is to be guarded against. There may be a fecal accumulation in connection with acute cæcitis, and this may simulate a tumor exterior to the cæcum. Doubt and apprehension in respect to the diagnosis, which cannot at first be avoided, will be removed during the progress of the case, for, if the affection be simply acute cæcitis, the local and general symptoms may be expected, within a few days, to subside, whereas, the course is otherewise if an abscess be developed behind the cæcum, or if purulent liquid be formed within a circumscribed space between the peritoneal surfaces.

In none of the cases of acute cæcitis which have fallen under the author's observation, has perforation of the intestine taken place, and the termination has in every instance been favorable.

Treatment of Acute Gastritis.

Except the gastritis be toxical, rarely, if ever, are emetics indicated. Ingesta contained within the stomach are removed by the acts of vomiting which the disease occasions. The most important object of treatment is to secure for the inflamed organs rest as complete as possible. With reference to this object, nothing should be taken into the stomach which will provoke vomiting or produce irritation. The patient should be nourished by means of rectal alimentation. Cold water, in small quantity at a time, or pounded ice, may be given if well tolerated, and not otherwise. The author has seen cases in which the local and general symptoms subsided speedily under this method of treatment. Opium is indicated to arrest peristaltic movements, or to allay pain or restlessness and procure sleep. A salt of morphia may sometimes be placed dry upon the tongue without exciting vomiting; but it answers as well to administer some form of opiate either by the rectum or hypodermically. Sinapisms applied over the epigastrium and warm applications afford relief. Alcoholics, if indicated by the general symptoms, should be given per enema. As the danger is in the direction of asthenia, they constitute an important part of the treatment whenever the symptoms denote failure of the vital powers. When the stomach tolerates food, the diet at first should consist of milk and lime-water, to which are to be added gradually farinaceous articles. The nutritive enemas should be continued until the stomach is capable of retaining an amount of food sufficient for support. Without adequate alimentary support, fatal exhaustion may take place after the acute symptoms have ceased. The author has met with a case illustrative of this fact. In this case, after food was retained by the stomach, aliment having been given wholly by the rectum for several days, collapse occurred owing to the apprehensions of the patient lest the ingestion of food might cause a return of the gastric symptoms, and the inefficiency of the nurses in carrying out dietetic instructions.

Functional weakness of the stomach continues for some time after acute gastritis, and hence care is requisite in returning to a full and varied diet, more especially as regards animal food.

If the disease have been caused by the abuse of alcohol, it is the duty of the physician to impress this fact, by way of warning, upon the patient.

Treatment of Toxical Gastritis.

The treatment in cases of gastritis caused by the ingestion of acrid or corrosive poisons, differs from that indicated when the disease is not of toxic origin only as regards measures for expelling the poison, and the employment of antidotal remedies. Poisons not entering at once into chemical combination with the mucous coat, should be evacuated as speedily as possible, either by a promptly acting efficient emetic, or by means of the stomach pump. The latter, if available, should be resorted to without delay if, from the nature of the poison, it be important to effect its removal from the stomach as speedily as possible. After resorting to the stomach pump, in order to neutralize what may remain adherent to the mucous membrane of poisons which have special antidotes, the latter are to be employed.[1]

Treatment of Acute Enteritis.

The first object is to make sure of a thorough evacuation of the intestinal contents. If this have not taken place, as determined by the number, size, and character of the dejections, together with the information obtained by manual examination of the abdomen, a cathartic is indicated. Drastic purgatives are to be avoided. Calomel, followed by a saline, is efficient and not irritating. A saline purgative without calomel, such as the Epsom or Rochelle salts, the citrate of magnesia or some one of the bitter waters, in doses repeated every four hours until free evacuations are produced, will accomplish the object. An emulsion of castor oil in small doses given at short intervals, is appropriate. After this indication has been fulfilled, opium is indicated for the same ends as in the treatment of acute gastritis, namely, the arrest of peristaltic movements, relief of pain or restlessness, and to procure sleep. It may be given by the mouth or by enema. Sinapisms, or other stimulating applications, and warm fomentations are useful as palliatives. The diet during the continuance of the disease should consist of milk and lime-water. Rectal alimentation is to be resorted to if there be irritability of the stomach preventing the ingestion of food. Alcoholics, given either by the mouth or rectum, are indicated in proportion as the symptoms denote failure of the vital powers. Care in diet during convalescence is requisite. Theoretically, until recovery is complete, animal should predominate over farinaceous food during the functional weakness which follows the disease.

---

[1] For a list of poisons, together with their symptoms, tests, and the antidotal treatment, *vide* Dunglison's Medical Dictionary, article on Poisons.

Treatment of Acute Dysentery.

In order to contribute facts toward our knowledge of the duration and termination of acute dysentery, irrespective of therapeutic agencies, the author some years ago analyzed ten recorded cases in which the disease was allowed to pursue its course without treatment. The results of that analysis show this disease to be self-limited, ending in recovery after an average duration of from eight to nine days from the time of the occurrence of dysenteric evacuation.[1] The disease was sporadic in these cases. An analysis of forty-nine cases, made by the author in 1853, different methods of treatment having been employed, gave, as a result, about the same duration.[2]

In a certain proportion of cases, this disease may be arrested by large, but non-emetic, doses of ipecacuanha. The author's hospital experience has not led him to expect that the disease can be controlled by this remedy in the majority of cases. The cases, however, which have been reported by Alfred A. Woodhull, Asst. Surgeon, U. S. Army, show conclusively that it is entitled to be called an abortive remedy.[3] It is to be given in a dose of from twenty to thirty grains, to which from twenty to thirty drops of laudanum may be added with advantage. As it is desirable that vomiting should not occur, very little, if any, liquid should be taken into the stomach for an hour afterward. In four or six hours after, the same dose or one-half the quantity of the drug may be given.

Discrepant opinions are held respecting the value of opium in the treatment of this disease. The author, from much experience, considers this remedy not less valuable in dysentery than in enteritis and gastritis. It fulfils the same indications as in the two latter affections, the most important being the arrest of the peristaltic movements. The remedy should be given in doses sufficient for that indication. It may be given by the rectum if retained, and, if not, either by the mouth or hypodermically. Stimulant and emollient applications to the abdomen, as in cases of enteritis and gastritis, are useful. The diet should leave as little residue after digestion as possible, in order thereby to secure rest of the large intestine. Concentrated meat broths, milk and eggs, given in small or moderate quantities at a time, should constitute the diet. Leube's meat solution (*vide* page 266) seems well adapted to the dietetic treatment of this disease, but the author cannot judge of its value from practical observation.

---

[1] *Vide* article entitled "A Contribution toward the Natural History of Acute Dysentery," Am. Journal of Med. Sciences, No. for July, 1875.

[2] *Vide* "Buffalo Medical Journal," numbers for July, August, September, and October, 1853.

[3] *Vide* "Studies, chiefly Clinical, in the Non-emetic Use of Ipecacuanha," 1876.

Care in diet is requisite during convalescence, but there is little if any danger of relapse. In temperate climates there is very little danger of the disease eventuating in chronic dysentery; but in tropical climates the danger is considerable, and, therefore, especial care is required in the treatment during convalescence. It is probable that deficient alimentation contributes to the danger of the disease becoming chronic; hence, the quantity of alimentary supplies should not fall below the requirements of nutrition, but the kinds of food, its preparation, the quantity taken at a time, etc., should be regulated with a view to completeness of digestion, and a minimum of fecal matters. Tonics, to promote digestion, pepsin, and the judicious use of wine after taking food, are useful in so far as they obviate a liability to indigestion and the passage of undigested aliment into the large intestine.

Epidemic dysentery may offer indications rarely present in sporadic cases. These indications depend on an extension of the inflammation over a larger portion or the whole of the large intestine, and intestinal transudation giving rise to profuse sero-sanguinolent dejections. Remedies to arrest or restrain the latter are indicated. The most efficient of these is opium, which should be given as freely as can be done without risk of producing a narcotic effect. There is an extraordinary tolerance of opium in some cases. The author has observed a case in which for several consecutive days a grain of the sulphate of morphia was given hourly without any evidence of narcotism, the patient not having been in the habit of taking this drug. The tolerance in individual cases is to be ascertained by gradually increasing the doses, and repeating them after intervals sufficiently long to observe the effect of each dose. The increased tolerance in some cases is not to be taken as a standard for the doses which can be given with safety in all cases; nor is the average quantity which may be tolerated, to be regarded as a criterion for individual cases. The practitioner must be guided in each case by the effects observed in that case, being careful not to produce narcotism. In conjunction with the employment of opium, astringents are useful in restraining the intestinal transudation. The most efficient are tannic acid given freely if well borne, the acetate of lead, and the solution of the pernitrate of iron, the latter given in small doses (one or two minims) sufficiently diluted, repeated hourly or half hourly.

Inasmuch as the tendency in the so-called malignant cases of dysentery is to produce death by asthenia, alcoholics are indicated in proportion as the symptoms denote this tendency. The tolerance of alcoholics is sometimes notably increased in this disease. A patient may take a quart or more of spirit daily without the least evidence of alcoholic excitation. The quantity to be given is to be graduated by the effects, in connection with the indicating symptoms. There can be no rule of quantity applicable to all cases. In the use of alcoholics, as of opium, the only trustworthy guide in each case is the result of the study of their effects in that case.

Treatment of Acute Typhlitis.

In the treatment of acute inflammation of the mucous membrane of the cæcum, a rational object, as in cases of enteritis and dysentery, is first to effect the removal of the contents of this portion of the intestinal canal. The object is especially important, inasmuch as there is apt to be fecal accumulation within the cæcum in cases of this disease. The practical objection to the use of cathartics for this object is the liability to error in discriminating acute typhlitis from perityphlitis with perforation of the intestine. In view of this liability, the prudential course is to withhold purgative remedies, even if an examination of the abdomen renders probable a fecal collection. The rectum and descending colon may be relieved of their contents by means of enemas, and these may be made more effective than by the ordinary mode if the injection be given through a flexible tube carried to or beyond the sigmoid flexure. Opium is indicated as in cases of acute inflammation of other sections of the alimentary canal, and also the use of stimulating and warm applications over the site of the cæcum. When the local symptoms denote subsidence of the acute disease, and perforation with perityphlic inflammation may be excluded, the contents of the bowels should be removed by moderate doses of Epsom salts repeated every four or six hours, or castor oil given in the same way. A single active purgative dose is contraindicated, the object being to effect the removal of the fecal contents more gently and thoroughly by a series of doses which singly would have but little cathartic effect.

Phlegmonous Inflammation of the Stomach and Intestines.

Suppurative inflammation seated in the areolar tissue uniting together the coats of the stomach, is a very rare affection. A collection of pus forming an abscess of the size of the fist, has been known to occur in this situation. The pus may either form an abscess or be diffused between the tunics of the stomach. An abscess of the size just named may be felt as a tumor in the epigastrium. If, after a tumor has been felt, vomiting of pus take place, and the tumor disappear, these facts, taken in connection with the history and symptoms, warrant a conjectural diagnosis. This may also be said if acute peritonitis be coincident with the disappearance of the tumor.

Leube, from an analysis of 31 cases, these being all that he was able to collect, gives the following assemblage of symptoms: "In the midst of perfect health, or after a period of general malaise, the individual is seized with pain in the stomach and vomiting, accompanied by thirst, dry tongue, small, frequent, irregular pulse, meteorism, and diarrhœa; subsequently delirium and prostration ensue, and finally death." Taking into account the great infrequency of the affection, hardly a conjectural diagnosis could be based on these symptoms.[1]

---

[1] For a report of two cases by Chvostek, of Vienna, *vide* Jahresberict von Virchow und Hirsch, 1877, page 207.

Suppurative inflammation of the intestines is a rarer affection than phlegmonous gastritis. A diagnosis is impossible.

SUBACUTE AND CHRONIC GASTRITIS, ENTERITIS, DYSENTERY, AND TYPHLITIS.

Subacute Gastritis.

Inflammation of the stomach is subacute when it gives rise to symptoms of much less severity than those of acute gastritis, the general debility not sufficient to compel patients to keep the bed. The local symptoms are the same in kind as those of acute gastritis, the difference being in degree. The appetite is more or less impaired, and there may be complete anorexia. Nausea and vomiting frequently occur, but they are not as persistent and prominent as when the inflammation is acute. The tongue is either furred or coated, and the patient complains of a bitter taste in the mouth. There is a desire for cold drinks. The epigastrium is tender on pressure. Frontal headache is a frequent symptom, and more or less marked. The bowels are generally constipated. The local symptoms are aggravated by the ingestion of food and stimulants. Symptomatic fever is slight. The spirits are usually depressed.

Subacute gastritis exists in cases of so-called acute dyspepsia, and in what is commonly known as a "bilious attack."

The inflammation may extend to the duodenum (subacute gastro-duodenitis), and, affecting the ductus communis choledochus, it gives rise to jaundice. This is the rationale of jaundice in the majority of the cases in which it is of transient duration.

With the foregoing group of symptoms, the affection is easily diagnosticated. It is to be differentiated from functional disorder of the stomach or dyspepsia. The symptoms of indigestion or of labored digestion are present in cases of subacute gastritis, if the diet be not restricted and regulated; but, superadded to these, are the impaired appetite, nausea or vomiting, thirst, epigastric tenderness, and slight fever, these symptoms being diagnostic of inflammation.

The causes are to be considered in the diagnosis. The affection often follows excesses in diet, the abuse of alcohol and an arrest of the process of digestion. It occurs in remittent fever and uræmia, in the latter condition being attributable to the presence of urinary principles eliminated vicariously by the mucous membrane of the small intestine. The diagnosis, however, from the symptoms, is not invalidated by the absence of any obvious causes, for these are by no means always apparent.

The old practice, still somewhat in vogue, of giving in this affection an emetic or an active cathartic, or both, is opposed by reason and experience. A saline laxative (Epsom or the Rochelle salts, or bitter water) given in small doses repeated every four or six hours until tolerably free evacuations are procured, suffices. Afterward, opium if the patient do not suffer from its after effects, is useful in small doses, by diminishing peristaltic movements. Sinapisms or small blisters to the epigastrium afford relief. An approximation to functional rest of the stomach is to be secured by giving bland articles of food, in a small quantity at a time. Milk and lime-water, with some farinaceous addition, should constitute the diet.

With this method of treatment, the inflammation may be expected to disappear within a few days. The return to a full diet should be gradual. If functional debility follow, a tonic remedy is indicated. Small doses of quinia, nux vomica, the mineral acids or the tincture of the chloride of iron, are eligible tonics.

Chronic Gastritis.

Persistence of symptoms which are diagnostic of subacute gastritis, denotes a chronic affection. In determining that this affection alone exists, ulcer and cancer of the stomach are to be excluded by the absence of their diagnostic symptoms which will be considered in connection with these structural diseases. Excluding these, the affection is to be differentiated from chronic functional disorder or dyspepsia. The neuralgic affection known as gastralgia is distinguished by symptoms, the absence of which renders its exclusion easy, and this affection is rarely associated with chronic gastritis.

Of the diversified symptoms arising from indigestion, or the abnormal changes which the ingesta undergo, none are diagnostic of chronic gastritis as distinguished from a purely functional disorder or from structural affections. Whenever these symptoms are present, are they associated, or not, with symptoms which denote either structural affections or inflammation? The answer to this question will affect materially therapeutic indications, as will be seen on contrasting the treatment of chronic gastritis with that indicated in cases of dyspepsia not associated with inflammation or lesions of structure.

An object in the treatment of chronic gastritis is to secure, by the regulation of diet, as much rest of the stomach as is compatible with adequate alimentation. Milk and farinaceous articles are indicated from their bland character and their digestion being in a great measure intestinal. The continued use of spirits is objectionable; but often anodynes may be prescribed with advantage. Cathartics are contraindicated, and laxatives are to be given only to obviate constipation. Counter-irritation, by means of small blisters or the croton oil liniment, over the epigastrium, is useful.

The restriction of the diet to milk and farinaceous food is to be temporary. As soon as other articles, namely, different kinds of meat, fish, fowl, and fruits, are taken with relish and digested, they are to be not only permitted, but recommended. Jaccoud advises that the diet from the first consist of animal food, and more especially the dark meats, claiming that these are better tolerated by the inflamed stomach than the articles which are digested in the small intestine. He advises that the patient be encouraged to take certain kinds of food which are supposed to excite, more than other kinds, the secretion of gastric juice, and he mentions boiled ham as particularly eligible for that purpose. The safest and best guides in the selection of the articles of diet are the desires of the patient and the results of experimental trials.

Leube advises his meat solution in cases of chronic and subacute gastritis (*vide* page 266).

The treatment of disorders of digestion, after the inflammatory state no longer exists, resolves itself into that of dyspepsia, and will be considered in connection with the latter affection.

Jaccoud recommends the hydropathic treatment in the cases of obstinate gastritis produced by the abuse of alcoholics.

SUBACUTE ENTERITIS.

Subacute inflammation of the small intestine, of brief duration, following excesses in diet, drastic purgatives, arrest of digestion from cold or other causes, and the vicarious elimination of urea, is not uncommon. It is a frequent affection in children during dentition and at the time of weaning. The symptoms are those of acute enteritis, the difference relating to intensity. Dysentery is excluded by the absence of the characteristic discharges, and by the tenderness not being localized in the tract of the large intestine. Gastritis is excluded by the absence of gastric symptoms denoting inflammation. The differentiation from functional diarrhœa is made by the local symptoms which denote an inflammatory affection and by slight fever. Diarrhœa is not always present. The dejections are often lienteric.

An indication for treatment is the removal of the contents of the small intestine if there be reason to suppose that ingesta are retained therein. This is to be determined by the number, size, and character of dejections which have taken place, together with the sense of fulness obtained by a manual examination of the abdomen. Tympanitic distension is evidence of undigested matter undergoing chemical changes, and diminished power of resistance of the muscular tunic. If evacuants be needed, an emulsion of castor oil, Epsom salts or some other saline purgative are suitable. After this indication has been fulfilled, and at once if the indication be not present, opium should be given in doses sufficient to relieve pain. The diet should be restricted to milk, with some farinaceous article added, if milk do not satisfy the desire for food, until the symptoms denoting inflammation disappear. Afterward a tonic remedy such as quinia, nux vomica, or some one of the bitter infusions, is useful.

CHRONIC ENTERITIS.

Exclusive of the colo-enteritis of children, a chronic inflammation of the small intestine is rare. In making this statement, the inflammation accompanying syphilitic or tuberculous ulcerations, and carcinomatous disease, are excluded. As in cases of acute and subacute enteritis, the diagnosis is to be based on pain, tenderness, and tympanites referable to the small intestine, diarrhœa and lienteric dejections, inflammation of the stomach and dysentery being excluded. Pain or uneasiness follows the ingestion of food, not immediately but after a time sufficient for the passage of ingesta into the small intestine, that is, from one to two or three hours. Frequent or habitual diarrhœa denoting a functional affection only is excluded by the presence of symptoms denoting inflammation.

A mild purgative from time to time is useful. Opiates are to be given with reserve, but small doses are beneficial. Chalk or bismuth may be combined with the opiate. The dietetic treatment is especially important. Theoretically, it would seem that animal food, being digested mainly in the stomach, should be best suited. However, the instincts and the experience of the patient are the most reliable guides in the choice and preparations of food. As a rule, a milk and farinaceous diet is best tolerated, and, when this is found to be the case, it is often advisable to limit the patient to it for a time. The surface of the body should be well protected against changes of temperature. Over-exertions, physical and mental, are to be avoided. If a change of climate be tried, one which is uniform, dry and cool or cold, is to be selected. A sea voyage may prove highly useful. Remedies to increase the digestive power of the stomach are indicated, inasmuch as it is desirable that as much of digestion as is possible should take place in this organ, thereby preventing the passage of undigested matter into the small intestine, and securing for the latter functional rest. Care is required not to continue a restricted diet too long, but to return to the dietetic habits most condusive to full health, as soon as the symptoms of inflammation disappear, and experimental trials show a resumption of the digestive capabilities of the intestinal canal.

The management of enteritis in young children requires attention to the state of the gums, proper clothing, and especially care in the selection and preparation of food.

Among the causes of subacute and chronic enteritis, is the presence of ammonia from the elimination of urea vicariously through the intestinal mucous membrane. Until this cause cease to be operative, only palliative remedies are indicated. Measures to promote the elimination of urea by the skin, namely, diaphoretics, and the hot air bath will afford relief.

SUBACUTE DYSENTERY.

Cases of subacute inflammation of the large intestine occur sporadically, and when dysentery prevails as an epidemic disease. The diagnostic symptoms are muco-sanguineous stools, with tormina and tenesmus, these, together with the general symptoms, denoting a milder affection than acute dysentery. The termination is always favorable except the liability, in a tropical climate, to the affection becoming chronic.

The bowels should be moved freely by castor oil or a saline purgative, and opium given either by the rectum or mouth, in doses sufficient to relieve the local symptoms. These measures, with the regulation of diet, constitute the treatment. The affection is not infrequently at once arrested.

CHRONIC DYSENTERY.

In the northern sections of this country chronic dysentery is rarely met with except it have been contracted in a warm climate.

It is diagnosticated by its having followed an attack of acute or subacute dysentery, and the presence in the diarrhœal discharges of muco-purulent matter. The dejections are often bloody, and in some cases profuse hemorrhage occurs. These characters distinguish it from chronic non-inflammatory diarrhœa, with which it is liable to be confounded. It enters into the pathology of cholera infantum, or the "summer complaint" of children.

In cases of chronic dysentery, after it has continued for a considerable period, the appetite and digestion fail, emaciation is progressive, the muscular strength diminishes, and death is preceded by the phenomena incident to extreme inanition. If recovery do not take place prior to these effects, the prognosis is extremely unfavorable.

The treatment of chronic dysentery embraces, first, curative remedies addressed directly to the local affection, and, second, measures to secure tolerance or promote recovery by maintaining and improving the general condition of the patient. For the relief of the local symptoms no other internal remedy can take the place of opium. This remedy, however, should be given with as much reserve as is compatible with its palliative effects, on account of its impairing appetite and digestion. It is best administered by enema or as a suppository. Experience has shown that several remedies, given in conjunction with opium, sometimes exert a curative influence. These are the nitrate of silver, from a quarter of a grain to a grain, the sulphate of copper, a twelfth to a fourth of a grain, the acetate of lead, from three to five grains, the doses of each being repeated three or four times in the twenty-four hours. A trial should be made of these remedies in succession, their use being continued sufficiently long to test fairly their utility. The practitioner must expect to be disappointed in a large proportion of cases. The subcarbonate or the subnitrate of bismuth is often useful as a palliative remedy, less doses of opium being required than if the latter were given alone. To secure the good effect of the bismuth, the doses should be at least half a drachm, given several times daily. Tannic acid should be tried, and the various astringent barks, namely, krameria, kino, catechu, rubus, and hæmatoxylon. As an astringent remedy, the solution of the pernitrate of iron may prove useful. The reliance for promoting tolerance and recovery is to be placed chiefly upon the dietetic and hygienic treatment. A milk diet may be tried, but it should not be persisted in if, within a short time, the local and general symptoms show no improvement. Inasmuch as the danger is from asthenia, alimentation is of vital importance. The object is to supply nutritious food as abundantly as can be done without risk of gastric or intestinal indigestion, selecting the kinds of food which, if digested, will leave the least possible residue to pass into the large intestine. The dietetic treatment must be governed in a great measure by the instincts and the experience of the patient. Articles of diet which are found to be well suited in some cases, prove not to be so in other cases; and, in the same case, articles may sometimes be well digested, and sometimes occasion disturbance from indigestion. It is far better to run some risk of indigestion in making trials of different kinds of food, than, in order to avoid the risk, to withhold nutriment which would be digested and assimilated. Protection of the surface of the body from cold is important. A sea-voyage, if the patient be not much enfeebled, may prove highly beneficial. The time occupied in crossing the Atlantic in steamers is too short to be of much avail; a longer voyage is required in order to test this measure. Removal from a tropical and a temperate climate to one uniformly cold and dry is perhaps the measure most to be relied upon for recovery. Cases in which the curative effect has been marvellous have fallen under the author's observation.

Topical treatment extending over the rectum, and even to the lower part of the colon, may be resorted to. The parts which can be brought into view by means of the speculum should be examined for a twofold object, namely, to ascertain if there be ulcerations to which local applications can be made guided by vision, and to avoid the error, which is sometimes committed, of mistaking for chronic dysentery carcinoma of the rectum.

Professor T. Gaillard Thomas has reported a case in which the success from topical applications within the rectum may be truly characterized as brilliant. The patient, a married lady, had suffered from chronic dysentery, following an acute attack, for five years. The dejections were frequent, always containing blood and mucus. There was at times considerable hemorrhage. She had been treated by several physicians, who had resorted to the various measures employed in such cases with only temporary improvement. The following account is quoted from Prof. Thomas's report: "On the 19th of September Dr. H. F. Walker anæsthetized the patient, and I proceeded to make a thorough examination of the rectum. After etherization she was placed in the left lateral position, and, after stretching of the sphincter ani by the fingers, a long duck-bill speculum was introduced. This was held by my nurse exactly as in vaginal examinations, while by a depressor I pressed downward the anterior rectal wall. No one who has not examined the rectum in this way can imagine the facility with which the whole canal can be seen. In this instance it was perfectly exposed up to the sigmoid flexure. I now cleansed it of all fecal matters by a long glass tube so bent upon itself at its upper extremity as to throw a stream of water from a Davidson's syringe back toward the anus. Throughout the whole extent of the intestine exposed to view the mucous membrane was seen swollen, œdematous, hanging in hæmorrhoidal masses, and studded with deep ulcers with grayish bottoms. It was greatly engorged, and presented that deep red, almost violet, hue which is seen in the throat in cases of diphtheria. On this occasion no application was made, and, as the anæsthetic had disturbed the patient's stomach and rendered her nervous, nothing more was done until the 30th of September. Then ether being again administered by Dr. Walker and the bowel thoroughly cleansed, I wrapped a small piece of wet cotton around the end of a whalebone rod, and, dipping it in pure commercial nitric acid, lightly touched the swollen mucous membrane and all the ulcers intervening between the sigmoid flexure and the anus. No superfluous fluid was allowed to attach itself to the cotton, and the cauterization was nowhere so decidedly practised as to render the occurrence of sloughing possible."

Upon recovery from the anæsthetic a slight amount of pain only was complained of, and writing of the subsequent effect the patient says: "It soothed me and I slept well. This was the first real respite which I had experienced in five years."

At this time the patient was confined to the milk-diet as much as possible, and limited as to exercise; but, as both these plans of treatment had been adopted and had failed before she came under my care, I did not deem it wise to press them too much upon her for fear of disheartening her. This application proved of decided benefit in diminishing the number of evacuations, the amount of blood passed, and the degree of pain experienced.

On the sixth of October another application of nitric acid was made. This proved still more beneficial. The patient in her written history declares, "The second application improved me very decidedly." After it the milk-diet was more strictly adhered to, and exercise was more restricted.

On the eleventh of October the third and last application was made. Dr. Walker and myself were then both struck by the great improvement in the appearance of the bowel. The ulcers had almost entirely disappeared; the mucous membrane was much less swollen; and the appearance of engorgement much modified. After this application the milk-diet was strictly adhered to, and the patient for ten days confined to bed. The result of this application surprised me. Blood ceased to pass with the evacuations; these in three days became limited to one in twenty-four hours; all pain ceased; and the patient rapidly improved in general appearance, in flesh, and in spirits. "To-day," she writes, "October twenty-sixth, I feel that I am entirely relieved, having now for eight days had only one action in every twenty-four hours. All pain has left me. I am gaining flesh, color, appetite, and spirits, and there is not even a trace of dysentery left."

On the twenty-second of October Mrs. X. left her bed, began to eat small amounts of animal food and bread, rode out every day, and on the twenty-ninth of October returned to her home in Kentucky.[1]

Information was received from this patient in the following November, stating that she had continued to improve with no return of the dysenteric symptoms.

Prof. Thomas stated his indebtedness to Dr. R. B. Maury, of Memphis, Tenn., for this plan of treatment. Dr. Maury, in a subsequent article, gives an account of fifteen cases in which the plan was pursued, complete and permanent recovery taking place in eleven. In a case which he gives in detail the patient had lost over sixty-five pounds in weight, the pulse was 120, and all the symptoms pointed to a fatal termination. In this case recovery was followed by restoration to vigorous health. Dr. Maury and Professor Thomas are of the opinion that the cure of inflammation and ulcerations within the rectum by topical applications leads to the cure of similar conditions seated above the limit to which these applications can be made by means of the speculum. Dr. Maury gives the following practical directions: "Proceed deliberately and carefully, as in any other surgical procedure. Always etherize the patient, and always stretch the sphincter ani. When properly done these are both perfectly safe measures. The patient being etherized, the operator is enabled to explore the rectum and make his applications deliberately and thoroughly. Paralyzing the sphincter is not only necessary to complete any satisfatory exploration, but the quieting influence secured thereby to the rectum can hardly be over-estimated. Put the patient in Sims's position for uterine examinations, and use Sims's vaginal speculum for examining the anterior and lateral walls of the rectum, and the bivalve with hinges on one side for examining the posterior wall." . . . "The patient should be required to remain in bed for a week or two when the treatment has been entered upon, and restriction to a milk and meat diet expedites the cure."[1] Dr. Maury has used for the topical remedy the nitrate of silver in the proportion of two drachms to an ounce of distilled water.

---

[1] *Vide* New York Medical Journal, January, 1876.

Injections of a solution of the nitrate of silver (ten to twenty grains to a pint of water) have been employed with advantage, the solution being carried into and beyond the sigmoid flexure by means of a flexible tube. The contents of the bowel should be washed away with tepid water before the administration of the medicated injection.

SUBACUTE AND CHRONIC TYPHLITIS.

Subacute inflammation limited to the cæcum gives rise to local symptoms the same in character as in acute typhlitis, but less in degree. Pain and tenderness are more or less marked within an area corresponding to the space which the cæcum occupies. In a certain proportion of cases the inflammation is accompanied, and may be produced, by an accumulation of excrementitious matters (fecal or stercoraceous typhlitis), giving rise to a swelling, perceptible perhaps to the eye as well as the touch, and having the configuration of the cæcum. Within the area of the swelling there is flatness on percussion. In other cases there is no impaction of feces, but the cæcum may be distended with gas, giving rise to tympanitic resonance. The inflammation may continue long enough to become a chronic affection.

In these cases, phlegmonous perityphlitis (fecal abscess) is to be excluded. This affection will be considered in connection with ulcerations of the intestine. A liability to the development of this affection, from perforation or an extension of the inflammation to the areolar tissue behind the cæcum, is to be kept in mind in the treatment. Caution requires that the removal of impacted feces within the cæcum should be effected with great care. Small doses of castor oil, or of a saline purgative, repeated after short intervals, are to be employed. Their operation may be aided by large injections into the colon made through a flexible tube carried up to the sigmoid flexure. An active purgative dose should not be given. The reason for the caution is this: if ulceration exist, and there be danger of perforation in the anterior aspect of the cæcum, it is a conservative provision for circumscribed peritonitis to precede the latter, and lead to an agglutination of the peritoneal surfaces, thereby preventing the escape of intestinal contents into the cavity of the peritoneum. An active purgative might hinder the adhesion, or cause disruption if it had already taken place, and thus give rise to general peritonitis. There is no indication for evacuant remedies if there be not fecal impaction.

---

[1] *Vide* New York Medical Journal, March, 1876.

Aside from the employment of means to remove an accumulation within the cæcum, in the cases in which this is an object of treatment, the indications are the same in character as in acute typhlitis.

Intussusception and carcinomatous tumors in the region of the cæcum are to be excluded in making a diagnosis of subacute and chronic typhlitis. These affections will be considered under appropriate headings. (*Vide* Intestinal Obstruction and Carcinoma of the Intestines.)

INFLAMMATION OF THE VERMIFORM APPENDIX OF THE CÆCUM.

Inflammation of the vermiform appendix claims separate notice. It may occur either with or without inflammation of the remainder of the cæcum. It is probably excited generally by either an accumulation of fecal matter or the presence of a foreign body within the cavity of the appendix. The production and retention of inflammatory products may occasion great distension. According to Virchow, the canal may be distended into a round sac of the size of a large fist.[1] With considerably less distension than this, a tumor may be felt through the abdominal walls if they be not too thick. The author is convinced that this is the explanation of "a painful tumor near the cæcum" described by James Jackson in his *Letters to a Young Physician*. The presence of a tumor, with more or less pain and tenderness, should excite at least a suspicion of inflammation with distension of the vermiform appendix, and this suspicion should govern the treatment.

The great object of treatment is to favor the conservative provision which is protective against the danger of an escape of the contents of the appendix into the peritoneal cavity; in other words, to promote peritoneal adhesions around the appendix before perforation takes place. For this object the peristaltic movements should be arrested by opium, which should be continued until all danger is passed. Quietude of the body should be enjoined, and a poultice or the warm water dressing kept applied over the cæcum. A cathartic should on no account be given.

This prudential plan of treatment is indicated, although, so far as the author's experience goes, the danger of perforation is less when the local symptoms are marked, than when they are obscure. Generally perforation of the appendix is preceded by symptoms so slight that they occasion but little inconvenience, not deemed sufficient to seek the advice of a physician, but perhaps, unfortunately, leading the patient to resort to an active purgative. In all cases coming under medical observation, pain and tenderness, either with or without tumor, referable to the region of the cæcum, should excite apprehension of danger from perforation, and the treatment should have reference thereto.

---

[1] *Vide* article by Leube in Ziemssen's Cyclopædia, Am. ed., vol. viii. p. 361.

PERITONITIS, ACUTE, CHRONIC AND CIRCUMSCRIBED. HYDRO-PERITONEUM.

A primary, general peritonitis, the inflammation diffused over a greater part or the whole of the peritoneum, is always a grave disease. A subacute, as distinguished from the chronic variety, is not, nosologically, recognized. Cases, however, differ much in degree of gravity. The consideration of peritoneal inflammation will be embraced under the above-named headings. Peritoneal dropsy, although not belonging among the inflammatory affections, is most advantageously considered in connection with peritonitis.

ACUTE PERITONITIS.

The local abdominal symptoms diagnostic of acute general peritonitis are as follows: Pain, burning and lancinating, usually intense, referable to the whole abdomen, but, in most cases, especially marked in a particular situation which is often the right iliac region. The pain is increased by a deep inspiration, by acts of coughing or sneezing, and by movements of the body. Tenderness on pressure is marked over the abdomen, but most so in the situation where the intensity of pain is greatest. The abdominal muscles are generally rigid, offering resistance to pressure. This is frequently a marked symptom. In the progress of the disease, the abdomen becomes more or less distended and tympanitic, the enlargement being sometimes very great. The bowels are usually constipated. Vomiting is a frequent, and sometimes a prominent symptom.

The respirations are increased in frequency, owing to diminished movements of the diaphragm from pain, the mechanical obstruction to its descent caused by the tympanites, and perhaps impaired muscular power of this respiratory muscle as an effect of the inflammation affecting its peritoneal covering. The breathing movements are costal. This may be a marked feature when local diagnostic symptoms are wanting. Its diagnostic significance, of course, is dependent on the exclusion of pulmonary disease. Arrest of the diaphragmatic movements, associated with grave constitutional symptoms, characterizes some cases in which, with slight abdominal tenderness, there is neither tympanites nor muscular resistance.

In the latter part of the disease hiccough is a frequent symptom. The face is haggard, the expression denotes distress, and the upper lip is sometimes drawn upward so as to expose the teeth. The decubitus is often significant; the patient lies on the back with the knees drawn upward, in order to relax the abdominal muscles and protect the abdomen from the weight of the bed-clothes. Retention of urine is common, requiring the use of the catheter. The pulse is usually frequent, but, in the early part of the disease, there is considerable variation as regards frequency in different cases. The frequency is a criterion of the gravity of the case. The other characters of the pulse vary in different cases; early in the disease, it is often small and hard. In fatal cases, the pulse becomes extremely frequent, weak, irregular, and is extinct before death. There is no uniform rule in respect of temperature. In some cases it is much raised, reaching 105°, or higher; but in other cases the elevation is moderate. A fall of temperature even within the normal range may precede a fatal ending. Priapism is an occasional symptom, and it may be accompanied by intense sexual desire. The mode of dying is typical of asthenia. The surface becomes cold, with perhaps a clammy perspiration, and death is preceded by the symptoms of collapse. The intellect generally remains intact until shortly before death, when the patient falls into coma. The suffering, as a rule, ceases before consciousness is lost, and patients sometimes become comparatively so comfortable that they are not readily led to appreciate the near approach of death.

Acute peritonitis is sometimes remarkably latent. The circulation gives way, and symptoms of collapse occur, without either abdominal pain or tenderness. In these cases the nature of the disease may not be positively determined before death. The author has met with several cases illustrative of this fact.

The affections which, to a certain extent, may simulate the local diagnostic symptons of peritonitis, are acute enteritis, and dermalgia of the abdominal integument. Acute enteritis lacks the intensity and the character of the pain which distinguishes peritonitis. Tenderness over the abdomen is much less marked. Rigidity of the muscular walls is wanting. Tympanites is not so great. There is less disturbance of the circulation, less prostration, and, in brief, as a rule, the general symptoms denote an affection of much less gravity. In dermalgia the abdomen is sometimes exquisitely sensitive, but light contact or percussion causes more pain than firm, deep pressure with the palm of the hand. Moreover, it is rare for the hyperæsthesia to be limited to the abdomen; it extends over the chest, and sometimes over the limbs. The circulation is not disturbed. Fever is absent. All the symptoms show an affection devoid of gravity.

In cases which have come under the author's observation, peritonitis has been mistaken for functional colic and sporadic cholera. Vomiting and purging, which happened to be prominent symptoms, led to the error of supposing the disease to be cholera, the autopsy revealing acute peritoneal inflammation. In the case of supposed colic, pain occurred in severe paroxysms as in the latter affection, and the patient, instead of keeping a fixed position, as is usual in peritonitis, behaved like a patient with colic, writhing, and not taking to the bed until shortly before death.

It is desirable, with reference especially to prognosis, to form a judgment concerning the causation in cases of acute peritonitis. With respect to this point of inquiry, it is to be considered that the disease, in the great proportion of cases, exclusive of puerperal peritonitis, is produced by a direct exciting cause, namely, either the intestinal contents, urine, pus, or bile. A truly idiopathic peritonitis is extremely rare. It may be caused by prolonged exposure to cold, and, thus produced, it occurs oftener in women than in men. Of the causes in men, perforation of the intestine is the most frequent. The chances are in favor of this causation, if other causes be not apparent. The judgment that it is due to intestinal perforation may be formed with great confidence, if the pain occur suddenly, and if it be at first localized; or, if the disease be developed in a patient with gastric ulcer, tuberculous ulceration of the intestines or chronic dysentery. If the disease have been preceded by more or less pain or uneasiness in the region of the cæcum, and the symptoms of peritoneal inflammation are at first localized in this region, a highly probable diagnosis is peritonitis from perforation of the vermiform appendix.

In a very large proportion of cases of acute peritonitis, the termination is fatal after a period varying from twenty-four hours to a week. The cases most likely to end in recovery are those in which the disease can be attributed to exposure to cold.

Treatment of Acute Peritonitis.

Bloodletting, either general or local, is contraindicated in this disease which tends to destroy life by asthenia, and which may involve danger of a fatal collapse within a few hours after the attack. Purgatives are contraindicated; they contravene the most important object of treatment, namely, complete immobility as regards peristaltic movements. The attainment of this object is essential if the peritonitis be due to perforation of the intestine, in order that agglutination of peritoneal surfaces may take place at the situation of the opening, and in this way, the further escape of intestinal contents be prevented. Complete immobility is also of primary importance when the disease is not caused by perforation. Even if there be reason to conclude that the intestinal canal is overloaded, it is better to allow it to remain so rather than to excite peristaltic movements by cathartic medicines. If, however, the patient suffer from fecal accumulation within the rectum, relief may with safety be procured by simple enemas which do not exert an effect beyond this portion of the large intestine. Except by this method, the bowels should not be moved during the course of the disease. Absence of any alvine evacuation for a week or ten days, or even longer, should not lead the practitioner to prescribe a purgative so long as the symptoms of acute inflammation continue. Caution is requisite after these symptoms have disappeared, lest, by a premature cathartic operation, acute inflammation be reproduced. Until danger of this is past, it is advisable to rely upon enemas.

Opium is the remedy to be relied upon, *par excellence*, in the treatment of this disease. There is a special object in the employment of this remedy, namely, the arrest of peristaltic movements. In securing this object, the physician is the coadjutor of nature, for, in this point of view, the paralysis of the muscular tunic of the intestinal canal, giving rise to tympanites, and the absence of diaphragmatic movements are conservative. The criterion, as regards the doses of opium, is entire relief of pain. The quantity of opium required for this end varies very much in different cases. In some cases the tolerance of this remedy is so much increased that enormous doses are necessary; in other cases, moderate or even small doses suffice. In every case it is to be ascertained, as speedily as possible, how much is required to secure entire relief of pain, and, in order to avoid narcotism, the intervals between the doses should be sufficient for determining the effect of each dose. From two to four hours are sufficient for this purpose. This method of treatment is to be steadily continued during the course of the disease. If not tolerated by the stomach, the opiates are to be administered hypodermically. In addition to the special object which pertains to this disease, opium is useful in the same way as in other affections, namely, by diminishing constitutional disturbance, procuring relief, and thereby increasing tolerance. It is important not to carry the use of opium so far as to produce narcotism. There is reason to think that lives are sometimes lost by excessive doses when these are not required to secure the advantages of the opium treatment. A degree of narcotism from which the patient is not easily roused is attended with danger in this disease. Complete arrest of the peristaltic movements, as denoted by freedom from pain, is evidence that the doses are sufficient. The employment of mercury with a view to its constitutional effects, has, at the present time, few advocates, but among these are some distinguished writers and teachers.

The application to the abdomen of cold, either by compresses wrung out in ice-water and renewed at intervals of a few minutes, or by the application of the ice-bag, recommended by Niemeyer, Jaccoud, and others, so far as the author's knowledge extends, has not come into use in this country. It is the opinion of the last-named author that it is of great use, provided it be maintained steadily during the acute period of the disease. On the other hand, warm, soothing applications are palliative of suffering. The spongio-piline is an excellent article for this purpose, being more easily managed than poultices, and more convenient than the ordinary water dressing. Irritation of the surface of the abdomen seems to be useful. Hot turpentine stupes are much used with a view to warmth and moderate irritation. Sinapisms may be applied in conjunction with the spongio-piline or the water-dressing. It is not an incongruity that cold and hot applications are both useful, each acting in a different way. The sensations of the patient may be perhaps relied upon in deciding upon either as preferable in individual cases.

Quinia in full doses is indicated, if the temperature be high, as an antipyretic remedy. Great frequency and feebleness of the pulse call for the free use of alcoholics, as in other affections in which the object is to arrest impending death by asthenia. The nourishment should be as concentrated as possible. Milk and strong meat broths may be given alternately in small quantity at short intervals. Suffering from great tympanitic distension of the abdomen is sometimes relieved by the careful introduction into the rectum of a flexible tube which permits the escape of gas from the large intestine. Accumulation of urine in the bladder should be guarded against by the timely use of the catheter.

Chronic peritonitis rarely follows, but convalescence is usually slow, more or less abdominal pain and tenderness existing for a considerable period.

CHRONIC PERITONITIS.

The local symptoms in cases of chronic peritoneal inflammation, diffused over the peritoneum, are colic pains, tenderness on pressure, constipation alternating with diarrhœa, and occasional vomiting. The abdomen is more or less tympanitic, and frequently the peritoneal cavity contains liquid effusion. It is exceptional for an accumulation of liquid to take place in sufficient quantity to simulate, in this regard, hydroperitoneum, but there are cases in which, from the amount of effusion, the latter is to be differentiated from chronic peritonitis. The differential points are the pain and tenderness in peritonitis, which are wanting if the liquid be purely dropsical. Facts relating to etiology are to be taken into account. Chronic peritonitis is generally due to tuberculous disease, and it is associated with pneumonic phthisis. The existence of the latter is evidence in behalf of peritoneal inflammation. When not dependent on tubercles, it may be incidental to carcinoma, and it is sometimes a secondary affection in cases of the renal lesions embraced under the name Bright's disease. It is probably never a purely idiopathic affection. On the other hand, hydroperitoneum is generally an effect of cirrhosis of the liver, and the previous history shows the abuse of alcohol.

Chronic peritonitis does not admit of curative treatment, for, sooner or later, it ends fatally. It is sometimes tolerated for a long period. The fatal termination may be caused by the associated affections rather than by the peritoneal inflammation.

The treatment embraces local palliative measures, namely, sinapisms, stimulating and anodyne liniments, the application of iodine, and moderate compression by means of a bandage; opium to relieve pain and diarrhœa; a nutritious alimentation; cod-liver oil and hygienic measures to improve nutrition, digestion, and appetite. Cathartics are to be avoided. Active counter-irritation is of no avail. Aside from palliation, the object of treatment is tolerance.

CIRCUMSCRIBED, LOCAL, OR PARTIAL PERITONITIS.

Inflammation of a portion, more or less limited, of the peritoneum, gives rise to pain and tenderness within the limits of its extent. As a rule, the degree of pain and tenderness is proportionate to the intensity of the inflammation. The fever and other constitutional symptoms are in like proportion. The localization of the pain and tenderness in one situation, and the general symptoms, exclude lumbo-abdominal neuralgia. Phlegmonous inflammation in the abdominal walls is excluded by the absence of the increased thickness and hardness of the integument which precede suppuration. Over the liver, the rubbing of roughened peritoneal surfaces in the respiratory movements sometimes gives rise to a friction murmur and a tactile sensation of friction.

Circumscribed peritonitis occurs in different situations, and the latter are expressed by the prefix *peri* to the names of the organs covered by the inflamed membrane; thus perihepatitis, perinephritis, perisplenitis, perityphlitis.

The diagnosis involves more than the existence of circumscribed peritoneal inflammation and its seat. The inflammation in most cases is secondary to some affection of the organ invested by the inflamed peritoneal membrane. Inflammation of the membrane investing the liver (perihepatitis) is generally secondary to cirrhosis, carcinoma, abscess, or some other hepatic disease; and so of the membrane investing the kidney, spleen, and cæcum. The existence therefore of circumscribed peritonitis always renders probable a local antecedent affection of some kind. Now in many instances the peritonitis is a conservative provision against serious accidents. The adhesions incident to inflammation situated over the site of ulcerations in the cæcum, stomach, duodenum, and other parts of the large and small intestine, protect against the danger which would otherwise attend perforation. Abscesses of the liver, spleen and kidneys are prevented from opening into the peritoneal cavity by inflammatory adhesions.

The antecedent local affections are not always determinable either prior to, or at the time of, the occurrence of circumscribed peritonitis. Gastric or intestinal ulcerations, hepatic abscess and cirrhosis of liver are sometimes ascertained, but these affections may be latent. It is therefore judicious to act in all cases as if the peritoneal inflammation were conservative. Absolute rest should be enjoined in order that the movements of the patient may not disturb the agglutination of the peritoneal surfaces. For the same reason cathartics are to be avoided. It may be a useful precaution to quiet peristaltic action by opiates. Compression of the abdomen by a bandage is of use. For the local symptom, palliative treatment only is indicated, namely, sinapisms, warm fomentations, or perhaps the application of cold if the inflammation be acute. Symptomatic indications relating to fever, etc. are to be followed. The diet should consist of articles easily and completely digested.

Circumscribed peritonitis produced by aneurismal, carcinomatous, and other tumors requires only palliative treatment.

Hydroperitoneum.

Dropsy of the peritoneum (ascites) is caused by a non-inflammatory transudation into the peritoneal cavity. An accumulation of liquid is determined by inspection, percussion, and palpation. When the patient is standing, an enlargement, equal on both sides and greatest at the lower part of the abdomen, is observed. If the patient lie upon the back, the liquid gravitating to the dependent part, the width of the abdomen is increased and the upper surface is flattened. A decubitus on either side causes the dependent side to sag, from the gravitation of the liquid to that side. When the patient is standing or sitting, percussion gives flatness from below upward for a greater or less distance, and above the limit of flatness there is usually tympanitic resonance caused by gas in the intestines which float upon the liquid. If the patient lie upon the back, or incline far backward, the tympanitic resonance extends downward below the line of flatness when the position of the body is vertical. Another method of demonstration is to percuss on one side of the abdomen when the body of the patient is inclined to that side, and afterward when the body is inclined to the other side; flatness of the depending side gives place to tympanitic resonance when the position of the body is changed. Placing the hand upon one side of the abdomen and percussing the opposite side, a sense of shock is felt, which is evidence of the presence of liquid. Another method is to place the hand upon the abdomen, and percuss within a short distance. The sense of fluctuation is obtained by this method.

A collection of liquid within the peritoneal cavity is to be discriminated from an ovarian cyst, a distended bladder, or a sacculated bladder, and pregnancy. An ovarian cyst forms at first a well-defined tumor situated in one side of the abdomen, gradually enlarging, and, for a long time, the abdominal enlargement is unequal on the two sides. Peritoneal dropsy may coexist with an ovarian cyst, and a tumor then may be discovered by pressure which displaces over it the liquid within the cavity of the peritoneum. A distended bladder forms a tumor in the hypogastric region, the limits of which are readily defined, and the introduction of a catheter at once determines the character of the tumor. A sacculated bladder forms a tumor connected with the bladder, the contents of which may be evacuated by catheterism. It is rare for a sense of fluctuation to be obtained in pregnancy. The other physical signs of hydroperitoneum are wanting, and, moreover, the signs of pregnancy are obtained by auscultation and ballottement in addition to the symptomatic evidence.

Having determined that the peritoneal cavity contains liquid, the next point is to determine that the liquid is dropsical, and not due to peritonitis. There is no difficulty in excluding acute peritonitis, from the absence of the local, together with the grave general, symptoms attending that disease. If inflammation exist, it is either subacute or chronic. Pain and tenderness point to peritonitis. A dropsical effusion is devoid of these symptoms, but they may be wanting in peritonitis. The quantity of liquid has a bearing on this differential diagnosis. It is rare for a large accumulation to take place in cases of chronic peritonitis, and, as a rule, the quantity of liquid, in cases of dropsy, becomes, either rapidly or slowly, large. Associated affections and causes are to be considered. In cases of chronic peritonitis, the disease is generally associated with either cancer or tubercles, and, if with the latter, the symptoms and signs show pneumonic phthisis. On the other hand, in the great majority of cases, hydroperitoneum is associated with cirrhosis of the liver, and with certain habits in regard to spirits, namely, taking them more or less largely and habitually on an empty stomach.

Hydroperitoneum, considered as an individual affection, is a local dropsy, that is, it is unaccompanied by dropsical effusion in other situations, except that œdema of the lower limbs generally occurs chiefly as a consequence of pressure upon the iliac veins and vena cava. More or less transudation into the peritoneal cavity takes place in cases of general dropsy or anasarca. In these cases the quantity of liquid is in proportion to the amount of effusion in other situations. If the abdomen be enlarged from the presence of liquid out of proportion to the anasarca, there is a local cause operative in addition to the causes of the general dropsy, and this local cause, in the majority of cases, is cirrhosis of the liver.

Peritoneal dropsy in a patient addicted to the use of alcoholics, especially in the form of spirit taken on an empty stomach, is almost conclusive evidence of cirrhosis of the liver. It may, however, proceed from obstruction of the portal vein by other causes, namely, a tumor pressing on the vessel, or venous thrombosis. The latter cause was exemplified in a case under the author's observation, of which the following is a synopsis: The patient, a man fifty-three years of age, was seized with profuse hæmatemesis. This was followed by peritoneal dropsy. The spleen was enormously enlarged. Tapping was resorted to, after which the patient failed rapidly and died by asthenia. In this case, the habits of life were opposed to the diagnosis of cirrhosis of the liver. Moreover, the development of the dropsy was more rapid, and grave constitutional symptoms occurred sooner, than in cases of the latter disease. The autopsy made by Dr. W. Welch showed thrombosis of the splenic and portal veins. Quoting Dr. Welch's report, "The portal vein near its division into its two primary branches was completely occluded by a reddish-gray antemortem thrombus. The thrombus could be traced for a short distance into the larger branches of the portal vein in the liver, and backward into the splenic vein. To account for the thrombus were several rough calcific plates on the inner surface of the splenic, and one on that part of the portal vein which projected into the lumen of the vessel, and had caused the coagulation of the blood."

Treatment of Peritoneal Dropsy.

A considerable collection of liquid within the cavity of the peritoneum compresses the abdominal organs, and thereby interferes with alimentation, digestion, and absorption. It contributes therefore to the general debility and emaciation which often accompany hydroperitoneum. To get rid of the liquid is the first object of treatment. Diuretics sometimes, but very rarely, succeed in effecting this object. The diuretic remedies enter the blood too slowly, on account of the portal obstruction, to produce much elimination by the kidneys. As they occasion less disturbance than cathartics, trial of them should be made. Hydragogue purgatives are much more likely to prove efficient. Of these, elaterium is the most potential. Given in small doses ($\frac{1}{16}$ to $\frac{1}{8}$ of a grain) at intervals of two or three hours, and suspending them when the purgative action begins, copious watery stools are produced with but little prostration. Great relief is felt if the abdominal dropsy be diminished. If this drug be found to have the desired effect, it may be continued, either in a small dose daily so as to maintain a moderate hydragogue operation for several days, or the same doses as at first may be repeated after intervals of a few days. If the drug be not well tolerated, other hydragogues less potential will sometimes give satisfactory results. The compound jalap powder (pulvis purgans) is one of the best of these. Epsom salts in some cases are highly efficient. The bitter waters will often be found useful in keeping up watery stools.

In many cases, hydragogue cathartics, as well as diuretics, fail in accomplishing the desired object. When these remedies have been fairly tried without success, paracentesis should be resorted to without delay. The objections which have heretofore led to the postponement of this measure until nothing is to be expected from it but transient relief, are entirely groundless. Whenever the accumulation of liquid is sufficient to occasion inconvenience from distension, it may be doubted whether it is judicious to delay for the trial of diuretics and hydragogues. It is desirable, if the patient be feeble, to avoid not only the loss of time, but the perturbation which these remedies occasion. The advantage of resorting to paracentesis early, is not only promptness of relief, but the removal, as speedily as possible, of an obstacle in the way of nutritive support, by an operation unattended with danger, and accomplishing in a few minutes what would require days or weeks by remedial means which, moreover, in a great majority of cases, are unsuccessful.

After removal of the liquid by paracentesis, it may not reaccumulate. In most cases, however, the dropsy returns either rapidly or gradually. The operation should be repeated as often as the amount of liquid is sufficient to cause inconvenience from distension.

In some cases, after a few tappings, the dropsical effusion ceases to recur for an indefinite period. This has been the result repeatedly in cases which have come under the author's observation. In a case seen with Dr. C. M. Allin, six or seven years ago, after ten or twelve tappings, there was no return of the dropsy, and the patient is now in good health. In this case the anæmia and debility of the patient seemed to offer but little hope of success. A noteworthy fact in this case is, the patient was led to adopt a diet of milk and gingerbread, to which he has adhered, mostly up to the present time.

In other cases, the tappings require to be repeated a great number of times, and in some of these cases the dropsy at length ceases to return. In a case under the author's observation, the operation was repeated thirty times in eighteen months. In a case reported by Dr. John H. Griffin in 1850, during a period of ten years, paracentesis was performed 186 times. Ten years afterward there had been no return of the dropsy, and the patient was in fair health.[1] Dr. Allan Jameison, in 1875, reported a case in which paracentesis was performed, during a period of four years, 133 times, after which the patient entirely recovered.[2] Dr. G. M. Wells reported to the author a case in which paracentesis was performed, during ten years, 180 times. The last operation was in 1840. In 1869 the patient was well, being at that time seventy-nine years of age.

An important advantage of resorting to the operation early, and repeating it as often as required, is, remedies and hygienic means to improve the general condition of the patient may be more effectually employed. This is the object of treatment in addition to the removal of the dropsical effusion. Whatever may be the local causes of the dropsy, the latter, in some cases, will not take place provided the functions of alimentation, digestion, assimilation, and nutrition can be brought to nearly the normal standard.

The treatment of peritoneal dropsy here recommended has been inculcated by the author in his lectures for the past twenty-five years, and his continued clinical experience has more and more confirmed its correctness.[3]

GASTRIC AND INTESTINAL ULCERATION. PERITYPHLITIC ABSCESS.

Ulceration of the stomach and intestinal canal occasions more or less functional disturbance. It involves a liability to perforation and hemorrhage. If cicatrization take place, obstruction is a not infrequent result. It is of importance in these several aspects. Ulcerations of the stomach, duodenum, ileum, cæcum, colon, and rectum will be considered under separate headings.

---

[1] *Vide* Am. Journ. Med. Sciences, April 1850.

[2] *Vide* Monthly Abstract, June, 1875.

[3] *Vide* "Clinical Report on Hydroperitoneum based on an Analysis of 46 Cases," Am. Journ. of Med. Sciences, April, 1863.

ULCERATION OF THE STOMACH.

The diagnosis of gastric ulcer must be based on symptoms directly referable to the stomach. The diagnostic symptoms relate to pain, tenderness, and vomiting. The pain is localized in the situation of the stomach. It has not the intensity of the pain in severe paroxysms of gastralgia, or in attacks of hepatic colic. Patients of their own accord, often call it a gnawing pain. It is either limited to, or notably increased during, the period that ingesta remain in the stomach. It generally follows speedily the ingestion of food. Certain articles of diet especially increase it, namely, animal food, stimulating condiments, saccharine substances, and alcoholics. The pain in neuralgia differs in these respects: it occurs oftenest when the stomach is empty; it is frequently relieved by the ingestion of food, and the articles just named are tolerated as well as, or better than, other kinds of food. Although pain is generally present and a prominent symptom in cases of gastric ulcer, it may be slight or wanting if the ulcer be very small, or situated (as it is in a minority of cases), in the anterior portion of the stomach. The absence of pain, therefore, is not sufficient to exclude ulceration.

Tenderness on pressure over the epigastrium is often a marked symptom. The diagnostic import, however, of this symptom is impaired by the natural sensitiveness of many persons in this situation, as also, by the fact that it is a symptom in subacute or chronic gastritis, and in some cases of dyspepsia, especially during stomach digestion. It is not always a prominent symptom in cases of gastric ulcer. It may be slight or wanting, if the ulcer be situated on the anterior wall of the stomach. The tenderness due to ulcer is limited to the space occupied by the stomach, and it is sometimes still more circumscribed.

The following are the diagnostic characters which relate to vomiting: It follows the ingestion of food, not immediately, but after a variable time, within the period required for stomach digestion. It is preceded by more or less distress or pain referable to the stomach. The evacuated contents of the stomach consist of food partially digested. The complete expulsion of the contents of the stomach is followed by a notable sense of relief. The frequency of vomiting varies in different cases, and this, like the other diagnostic symptoms, is not always present. The vomiting of blood (hæmatemesis) is especially diagnostic when taken in connection with other symptoms. Indeed, associated with other diagnostic symptoms, the presence of blood, which, according to the length of time it remains in the stomach, is dark, grumous, or resembling coffee-grounds, renders the diagnosis positive. This symptom, however, is by no means constant.

The foregoing symptoms may be absent, not only singly, but collectively. Death sometimes follows a profuse hemorrhage or perforation of the stomach, these events not having been preceded by symptoms denoting more than functional disturbance, or dyspepsia. The disease may be completely latent. The small, perforating ulcer exists in these cases. An ulcer not much larger than a pin's point may open an artery and give rise to a fatal hemorrhage. The instances of complete latency are, however, exceptional.

Aside from local symptoms, there is nothing directly diagnostic of gastric ulcer. There are, however, certain points which aid in the exclusion of other affections. The facts which have been stated in relation to the intensity of pain and its relations to the ingestion of food, exclude gastralgia; yet this affection may be associated with ulcer, and the diagnosis of the latter must then rest upon its distinctive symptoms. Leube states that the pain in gastralgia disappears in a few minutes after the application of a constant current of electricity from a battery of from twenty to forty cells, whereas, in gastric ulcer he had never been able to produce cessation of pain by the constant current.

Chronic gastritis is excluded by the absence of mucus, in more or less abundance, in the matters vomited, and the less intensity of pain after the ingestion of food. If, however, as is sometimes the case, gastritis and ulcer coexist, the differential diagnosis is not easy, unless gastric hemorrhage occur; this is decisive in behalf of ulcer. The functional vomiting which occurs chiefly in young girls, is not accompanied by the epigastric pain and circumscribed tenderness which characterize ulcer, nor by hemorrhage; and in the former affection the rejection of ingesta follows directly their introduction into the stomach. Moreover, in connection with intolerance of the ingesta by the stomach, hysterical phenomena are generally present. On the other hand, inasmuch as the diagnostic symptoms of gastric ulcer, severally or collectively, may be absent, an exclusion of the latter affection is not always practicable.

Cancer of the stomach and ulcer have local symptoms in common, namely, pain, vomiting, and hæmatemesis. There is a reason for this in the fact that cancer in its progress leads to ulceration. The discrimination embraces the following differential points: Cancer occurs in persons of middle or advanced age; simple ulcer in young subjects and especially in young women. The straw-colored complexion which is frequently present in cases of cancer, is wanting in cases of simple ulcer. Hemorrhage is very rarely profuse in cases of cancer. In the latter disease a tumor is generally felt within or below the epigastrium.

Treatment of Gastric Ulcer.

Since it is now well ascertained that the system can be well nourished for an indefinite period by rectal alimentation, the employment of this measure, in order to secure for the stomach absolute rest, is rationally indicated; and experience has demonstrated the success of this method of treatment. The articles of diet which may be employed, and the practical rules for nourishment by the rectum have been already considered (*vide* page 266). Nothing is to be introduced into the stomach except water in small quantity at a time, until the disappearance of the local symptoms warrants the trial of a little nutriment. Milk and limewater constitute the best form of gastric food at first, and other articles are to be added or substituted cautiously. Pain in the stomach is to be relieved by opiates given either by the rectum or hypodermically. Drugs should be withheld from the stomach. The use of saline laxatives for several successive days, as recommended by Leube, is contraindicated by the fundamental principle of the treatment, namely, rest of the affected organ. Quietude of the body is to be enjoined. Leube recommeds his "meat solution" (*vide* page 266) as an appropriate form of nourishment for the stomach in this affection. Artificially digested food (peptones) have the advantage of not requiring functional labor on the part of the stomach; but entire abstinence from the ingestion of food is the safer course. Food should be given by the stomach only when the rectum is intolerant of it. With proper care, rectal alimentation is rarely impracticable. Care in diet is important after recovery from gastric ulcer. The treatment of hemorrhage from the stomach, in cases of gastric ulcer and other affections, has been considered (*vide* page 253).

ULCERATION OF THE DUODENUM.

Ulceration in this portion of the alimentary canal being in most cases seated near the stomach, the symptoms are the same as in gastric ulcer. The differential diagnosis can rarely be made with positiveness. If hemorrhage occur, the blood may pass upward and appear in matters vomited. Pain and vomiting do not follow the ingestion of food as soon as in some cases of gastric ulcer, but there is not much difference in this regard if the latter be situated near the pylorus. Jaundice may occur if the ulceration be near the opening of the ductus communis choledochus. If the symptoms follow an extensive burn of the skin, duodenal ulcer is probable. Irrespective of that pathological connection, the chances are in favor of gastric, rather than duodenal, ulcer, from the fact that the latter is comparatively rare. The treatment is the same as in cases of gastric ulcer.

In view of the infrequency of duodenal ulcer and the difficulty of diagnosis, a synopsis of the histories of the two following cases is introduced:—

Miss. P., school teacher, aged about thirty, was seen by the author in consultation early in May, 1875. She was greatly emaciated and very feeble. She had suffered much from abdominal pain, and had been led to the use of morphia, taking about a grain daily. She had dyspeptic ailments, but the usual diagnostic symptoms of gastric ulcer were wanting. A diagnosis was not made. She was advised to discontinue the use of morphia, and to take nutritious food with tonic remedies. She improved in a marked degree in the following few weeks, when she was suddenly seized with intense pain in the abdomen, tympanites, and prostration. At a second consultation on the day after the seizure, the symptoms of peritonitis were marked, and death took place on this day. The autopsy revealed the existence of an ulcer with perforation, just below the pylorus, oblong in form, an inch in length, with everted and thickened margins. Around the ulcer the intestine was adherent to the pancreas. The adhesions had given way sufficiently for the escape of liquid into the peritoneal cavity. The usual anatomical characters of acute peritonitis were present.

The second case came under observation in October, 1877. The patient, a man aged thirty-seven, had been subject to paroxysms of pain in the region of the stomach for ten years. For several years the attacks were light and relieved by pressure and a stimulant. For the past two years in the autumn and spring, the attacks recurred daily for about a month. At the time of the consultation he was suffering from these attacks. Within six or seven years he had had five attacks of hæmatemesis, never very profuse, and not accompanied by pain. The last attack was in May, 1877. He had recently restricted his diet, and was now living chiefly on oatmeal. In the intervals between the attacks of pain, he was perfectly well, as regards appetite, digestion, etc. Death occurred some months afterward, the immediate cause being profuse hemorrhage. The autopsy in this case revealed an ulcer just below the pylorus three-fourths of an inch in length and a quarter of an inch in width. The margins of the ulcer were thickened. The loss of substance extended nearly to the peritoneal coat and for a considerable space beneath the margins of the ulcer. At the base of the ulcer the open mouth of a small artery was apparent.

The author has met a case in which pyloric stenosis was caused by an ulcer within the duodenum, death, preceded by uncontrollable vomiting, taking place from slow inanition.

ULCERATION OF THE ILEUM.

Ulcers below the duodenum, within the small intestine, are generally situated in the lower portion of the ileum. Ulcers which follow sloughing of the agminated and solitary glands, are characteristic of typhoid fever. They underlie the local and diagnostic symptoms and certain important events in the clinical history of that disease. In the great majority of cases, ulcers in this situation, and sometimes of the large intestine in addition, are associated with pulmonic phthisis. The latter affection, especially in young subjects, is sometimes slight. "Consumption of the bowels" is a popular term applied to this affection. A persistent diarrhœa, in a phthisical patient, renders it probable that ulceration exists; but, on the other hand, numerous ulcers may exist without diarrhœa, so that they cannot be positively excluded by the absence of the latter. Tuberculous ulcers may give rise to the most prominent symptoms in a case, and the pulmonary symptoms being slight, the association with phthisis is liable to be overlooked without careful exploration of the chest. The signs of pulmonic phthisis in these cases are the basis of the diagnosis of the intestinal affection, inasmuch as tuberculous ulceration very rarely, if ever, exists when the lungs are free from disease. Peritonitis developed suddenly in a phthisical patient with diarrhœa, renders probable the diagnosis of a tuberculous ulceration which has led to perforation of the intestine.

Numerous minute follicular ulcerations, either in the small or large intestine, are sometimes incident to enteritis, colitis, or entero-colitis (simple catarrhal ulcers). These may cicatrize, or, by eroding the several coats of the intestine, they may cause either profuse hemorrhage, perforation, or both. The presence in the dejections of transparent particles resembling frog-spawn or boiled sago grain, is considered as a diagnostic symptom, these particles being casts of the follicular ulcers.[1]

---

[1] *Vide* Leube's Article in Ziemssen's Cyclopædia, Am. edition, vol. vii. p. 413.

Ulceration of the small intestine is among the rare events occurring in cases of syphilitic disease. Persistent diarrhœa in a syphilitic patient, therefore, warrants a suspicion of ulceration. Syphilitic, typhoid, and tuberculous ulcers are distinguished as specific. Irrespective of these pathological connections, a diagnosis is hardly practicable, inasmuch as mere diarrhœa, although persisting, and the character of the dejections are not diagnostic, even if ulceration of the large intestine be excluded. Without diarrhœa, hemorrhage, or perforation of the intestine, ulceration cannot with any degree of certainty be predicated upon local symptoms.

The treatment of typhoid ulcers belongs to the consideration of typhoid fever. Tuberculous ulcers are to be treated by opium, and a diet nutritious but as easily and completely digested as possible. Cicatrization is not to be expected, but the symptoms admit of palliation, and the progress of ulceration may perhaps be retarded. Ulcerations which are not specific in character, may heal completely, with a liability to contraction of the intestinal canal as an effect of cicatrization. The principle of treatment is to secure as much rest of the intestine as is consistent with adequate alimentation.

ULCERATION OF THE CÆCUM. PERITYPHLITIC ABSCESS.

In cases of specific ulceration of the small intestine, namely, typhoid, tuberculous, and syphilitic, ulcers are frequently found in the cæcum. Exclusive of these cases, and also of dysentery, ulceration may be incident to acute or subacute typhlitis (*vide* page 294). But most frequently the cæcal ulceration is due to local causes, and is not preceded by symptoms of typhlitic inflammation.

The seat of the ulceration (or sloughing process) is usually the vermiform appendix. If neither perforation nor perityphlitis take place, a positive diagnosis is hardly practicable. The ulcers may heal without any untoward symptoms. Perforation may give rise to general peritonitis proving rapidly fatal. Perforation, however, of either the appendix or the anterior aspect of the cæcum, may cause circumscribed peritoneal inflammation. General peritonitis is prevented by adhesions of the peritoneal surfaces in contact around the perforation. The result is a peritoneal abscess bounded by these adhesions. If, on the other hand, the ulceration be situated on the posterior aspect of the cæcum, suppurative inflammation of the cellular tissue external to the peritoneum may be induced without perforation; but, in most instances, the perityphlitic affection is due to perforation. When the latter occurs, the intestinal gases and other contents may be diffused throughout the abdominal walls. In a case which the author saw with his colleague Prof. James R. Wood, the abdomen was enormously distended with the gaseous and other intestinal contents, together with pus, which were extra-peritoneal. An incision gave exit to gas and purulent liquid having an offensive fecal odor. The patient speedily succumbed. The usual perityphlitic suppuration is less grave; the inflammation is circumscribed, and an abscess, commonly known as a fecal abscess, is the result.

It is thus seen that cases of perityphlitic suppuration admit of division into three groups, to wit, diffused cellulitis, a collection of pus between the peritoneal surfaces, and a circumscribed abscess external to the peritoneum. The two latter are of especial importance, inasmuch as they admit of recovery, either spontaneously, or by means of timely surgical interference.

A circumscribed suppurative peritonitis dependent on perforation, generally of the appendix, presents these diagnostic features: Pain, more or less intense and localized in the ileo-cæcal region, occurs suddenly, sometimes when the patient is apparently in perfect health, or it may be preceded by obscure local symptoms. Tenderness on pressure is marked within the right iliac fossa. Febrile movement accompanies these local symptoms. The local and general symptoms compel the patient to take to the bed. After a few days, palpation discloses what appears to be a tumor, or a sense of resistance within a circumscribed space, the boundaries of which are not always well defined. There may be an enlargement apparent to the eye. Percussion gives flatness, or, in some instances, a tympanitic resonance. The latter is caused by the presence of intestinal gas within the abscess. After a week or longer, a sense of fluctuation may be felt.

The development of the foregoing signs obtained by palpation and percussion, while the case is under observation, is an important point in the diagnosis. This excludes carcinoma and fecal accumulation within the cæcum. These are also excluded by the evidence, afforded by palpation, that the tumor is connected with the abdominal wall. Caution is requisite not to make strong or violent pressure, lest the adhesions may be ruptured, and the contents of the peritoneal abscess escape into the cavity of the peritoneum.

In cases of suppurative inflammation behind the cæcum, and external to the peritoneum, the pus may migrate in different directions. A fecal abscess originating in that situation may make its appearance in the groin above Poupart's ligament, in the upper part of the thigh, in the abdominal walls above the iliac fossa, and in or below the buttock. In a case related to the author by a medical friend, the pus made its way upward, and a spontaneous discharge took place into the bronchial tubes. The pus may be discharged through the cæcum, or, descending, may be evacuated through an ulcerated opening into the rectum. There is danger of rupture into the peritoneal cavity, and consequent general peritonitis.

Treatment of Perityphlitic Abscess.

A localized suppurative peritonitis from perforation may end spontaneously in a favorable manner. In a hospital case under the author's observation, the patient on admission presented a fluctuating tumor over the cæcum. Its connection with the latter was not suspected until it was opened, when a dirty looking purulent liquid and gas, having a fecal odor, escaped. A probe introduced into the opening passed into the cæcum. The discharge soon ceased, the opening closed, and the recovery was complete. In some rare cases the pus is absorbed and recovery takes place by resolution. A favorable termination may follow the discharge of the contents of the abscess into the cæcum, and their discharge per anum.

This result has also followed an opening into the bladder. The latter is denoted by the discharge per urethram of fetid pus, intestinal gas, and sometimes lumbrici. The author has met with a hospital case in which a fistulous communication between the cæcum and bladder had taken place in this way, fecal matter appearing, from time to time, in the urine. The general condition of the patient was fair, and the case passed from under observation without any material change.

In the great majority of cases, without prompt and surgical interference, the termination is fatal, either from general peritonitis, septicæmia, or the exhaustion caused by the persistence of the purulent discharge through a spontaneous fistulous opening.

The surgical treatment consists in opening the abscess as soon as the character of the affection is determined, not waiting for a sense of fluctuation. A case in which this treatment was employed with success was reported by Mr. Hancock, of London, in 1848.[1] The report of this case, however, failed to attract attention. In March, 1867, Prof. Willard Parker reported a case of the successful employment of this method.[2] Since that date it has been employed by the late Dr. Buck, Prof. H. B. Sands, Prof. J. R. Wood, Dr. Leonard Weber, and others, with uniform success. The reproduction of the method of treatment by Prof. Parker, quoting the language of Dr. Buck, "may be said to have disarmed this disease of its terrors, and changed its issue from an almost invariably fatal result to the reverse."[3] The operation, as inaugurated by Prof. Parker, consists in making an incision over the tumor, dividing the skin and subjacent tendinous and muscular layers, until the fascia transversalis is exposed. An exploring needle or fine trocar was then introduced in search of matter, and the puncture afterwards enlarged to a free opening. In one of the cases analyzed by Dr Buck, the contents of the abscess were removed by aspiration, a free opening being, however, made subsequently; and in one case, after the fascia transversalis had been exposed, fluctuation not being perceived, the wound was kept open, and a spontaneous discharge subsequently took place. The wound should in all cases be kept open, by means of a full-sized tent, for several days. Dr. Buck enjoins the importance of not delaying the operation longer than a week after the onset of the disease. It is hardly necessary to add that surgical interference is not called for in cases of general peritonitis from perforation.

The treatment prior to the operation, should consist of warm fomentations over the seat of the pain and tenderness, opium in doses sufficient to relieve pain, and absolute rest. The propriety of cathartic medicines is questionable, owing to the danger of either preventing the protective peritoneal adhesions, or causing them to give way when they have taken place, and thus permitting the escape of fecal and purulent matters into the cavity of the peritoneum.

---

[1] *Vide* London Medical Gazette, new series, vol. vii. p. 547.

[2] *Vide* New York Medical Record, March 15, 1867.

[3] *Vide* article by Dr. Buck entitled "Abscesses originating in the Right Iliac Fossa," Transactions New York Academy of Medicine, Sept. 1874. An analysis of ten cases is given in Dr. Buck's article, together with details relating to the operation and subsequent treatment. *Vide* article by Prof. Sands, in Am. Journ. of Med. Sciences, April, 1878.

Abscesses situated external to the peritoneum, which may or may not originate from perforation of the cæcum, are to be opened whenever and wherever they make their appearance. The treatment is thus surgical, and is considered in works on surgery.

ULCERATION OF THE COLON AND RECTUM.

Ulcers in the colon occur in some cases of typhoid fever, phthisis, and syphilis. They are generally incident to chronic dysentery. They may, however, be independent of all these pathological connections. They are not always accompanied by marked diagnostic symptoms, and they are sometimes entirely latent. In a hospital case recently under the author's observation, there had been some discharge of blood, but the patient was up, and performed slight labor a few days before her death which took place suddenly with the symptoms of collapse. The colon was found to be literally riddled with ulcers; perforation had taken place, and a considerable quantity of blood was contained in the peritoneal cavity.

The treatment is essentially that indicated in cases of chronic dysentery.

Ulcers within the rectum, as connected with chronic dysentery, have been referred to (*vide* page 292). Irrespective of this connection, they are embraced in the diseases of the rectum which belong properly to surgery. Perforation here, as of the cæcum, gives rise to suppurative inflammation around the intestine and external to the peritoneum (periproctitis).

CANCER OF THE STOMACH, INTESTINES, AND PERITONEUM.

Carcinoma is to be included in the group of structural affections causing gastric or intestinal obstruction, and will be referred to under that heading. The importance, however, of the diagnosis, demands for the disease a separate consideration.

CANCER OF THE STOMACH.

The gastric symptoms in cases of carcinoma of the stomach, relate to pain, epigastric tenderness, appetite, indigestion, and vomiting. Pain is usually more or less marked, but it is sometimes wanting. As a rule, it is more constant, but less intense, than in cases of gastric ulcer. Lancinating pains, such as accompany cancer in some other situations, are often wanting. Tenderness over the epigastrium is a symptom rarely absent, but it is not more marked than in cases of chronic gastritis and gastric ulcer. The appetite is usually notably impaired; more so, as a rule, than in chronic gastritis, ulcer, and dyspepsia. Evidences of indigestion generally are present aside from vomiting. They are, distress after the ingestion of food, flatulency, cardialgia, and pyrosis. These symptoms are also present in cases of gastritis, ulcer, and merely functional disorder or dyspepsia. Few, if any, cases are devoid of vomiting, but its prominence as a symptom varies. It sometimes follows the ingestion of food as in cases of ulcer, and in these cases ulcer and cancer coexist. Coexisting gastritis is sometimes the immediate cause. If the cancerous affection produce stenosis of the pylorus, the ingesta accumulate in the stomach, and are rejected either by frequent regurgitation or copious emesis from time to time. The variations as regards vomiting are thus due to conditions incident to the disease, namely, ulceration, inflammation of the mucous membrane, pyloric contraction, and indigestion from deficiency of the gastric juice and other causes. Situated at the cardiac orifice, and producing stenosis in this situation, food accumulates in the œsophagus, and is rejected by regurgitation. The matters vomited frequently contain blood. Profuse hæmatemesis is rare, and the blood vomited is usually changed by the gastric fluids, and has the appearance of coffee grounds. The histological elements of cancer have been found in matters vomited; but the absence of this diagnostic evidence, from its infrequency, is of no value in excluding the disease.

The general, taken in connection with the local, symptoms, are of great importance in the diagnosis. With very few exceptions, the loss in weight and muscular strength is more or less rapidly progressive. Pallor of the complexion is usually marked, and in certain cases the skin presents a fawn or straw-colored appearance, which is characteristic of the cancerous cachexia. In the progress of the disease the lower limbs not infrequently became œdematous, and there is sometimes general œdema or anasarca.

In a small proportion of cases, the lymphatic glands, especially above the clavicles, become enlarged, and this fact has some diagnostic significance in connection with the gastric symptoms. Inasmuch as cancer of the stomach is almost always primary, the diagnostician has not the advantage of an antecedent cancerous affection in some other situation. Cancer of the liver in some cases occurs as a secondary affection.

Age is to be considered in the diagnosis of cancer. It is extremely rare for the disease to occur in persons under forty years of age. The period of life in which it is of most frequent occurrence is between sixty and seventy. This is a point of much importance in differentiating the disease from simple ulcer of the stomach. The latter is most frequent in early life. Another differential point relates to sex; ulcer occurs oftener in women than in men, whereas, the two sexes are about equally represented in cases of cancer.

The symptomatic history of cancer embraces points which are diagnostic. But these points are by no means always available in diagnosis. They may fail to be present, severally and collectively. It is a well-known clinical fact that cancer of the stomach is sometimes remarkably latent for a considerable period, as regards local and general symptoms. Moreover, the symptoms which have diagnostic import, namely, pain and tenderness, vomiting and hæmatemesis, occur without essential modifications in other affections. A positive diagnosis requires, in addition to symptomatic evidence, that obtained by physical examination, in other words, the discovery of a tumor referable to the stomach. Without this additional evidence, a probable diagnosis only is warrantable.

A cancerous tumor of the stomach is not always discoverable, nor is it always easily distinguished from other abdominal tumors. In the great majority of cases it is seated in the pyloric extremity. It may be movable or fixed; the latter is the rule. It is sometimes readily isolated from the adjacent parts by means of palpation, but its boundaries are not in all cases well defined. It may be felt to be a smooth, round, or oval tumor, or it has an irregular form, with an uneven, nodulated surface. Its situation is generally in the epigastrium on the right side, but there is considerable variation in this regard. If the tumor be not fixed, its weight may cause it to descend below the epigastrium. Its situation may be altered by different conditions of the stomach as regards distension from gaseous or other contents. As a rule, it is but little, if at all, depressed by the descent of the diaphragm in a deep inspiration. Owing to differences in the degree of distension of the stomach, a tumor which is distinctly appreciated at some examinations, is not at all times discoverable. A circumscribed rigidity of the rectus muscle may give a sense of resistance which simulates a tumor. To avoid this liability to error, and to render the examination in other respects satisfactory, the patient should lie upon the back, with the lower limbs raised, and the abdomen should be voluntarily relaxed as much as possible.

A gastric tumor is to be discriminated from cancer of the left lobe of the liver, aneurism of the abdominal aorta, fecal accumulation in the transverse colon, and enlargement of the pancreas. If the left lobe of the liver be enlarged, there is usually flatness on percussion, whereas over a gastric tumor there is a dull tympanitic resonance. A deep inspiration causes an appreciable depression of the liver. Flatness on percussion and a sense of resistance are continuous from the left to the right lobe. It is to be borne in mind that cancer of the liver is sometimes associated with cancer of the stomach. A cancerous tumor of the stomach sometimes presents, to the touch and eye, a pulsation from its proximity to the aorta. It may simulate aneurism, not only in this respect, but in the presence of a systolic and sometimes a double murmur on auscultation. Aneurism is to be excluded by the absence of lateral expansion of the tumor, and of the characteristic localized pain in the situation of the tumor and in the back, existing independently of different gastric conditions. Fecal accumulation in the colon is excluded by the absence of the diagnostic features to be hereafter stated. A cancerous enlargement of the pancreas may present all the physical characters of cancer of the stomach. The differential diagnosis must be based on the comparative infrequency of the former, and on the presence of gastric symptoms which denote the latter.

In deciding that a tumor in the epigastrium is referable to the stomach, the association with gastric symptoms is, of course, a weighty consideration. It is in the cases of cancer of the stomach which are wanting in diagnostic symptoms, that the decision is attended with difficulty.

Sarcomatous and other morbid growths situated in the stomach, if they give rise to an appreciable tumor, cannot be differentiated from cancer by means of physical characters. They are not accompanied by the diagnostic gastric symptoms of cancer, but, as these are sometimes wanting in the latter affection, it cannot be excluded by their absence. In view of the infrequency of other tumors of the stomach, they may, for this reason, be practically excluded in cases which admit of doubt.

Cancer seated at the cardiac orifice does not give rise to an appreciable tumor. The prominent symptoms are caused by obstruction. There is progressively increasing difficulty in swallowing solid food. At length only liquids pass into the stomach, and these finally are regurgitated directly after deglutition. In a case which the author has reported, the contraction was so great that, after death, a fine silver probe was passed with difficulty.[1] The situation of the obstruction is ascertained by passing a bougie or probang into the œsophagus down to the cardiac orifice. If the bougie pass into the contracted space, it may bring away matter which, under the microscope, shows cancerous elements.

Treatment of Cancer of the Stomach.

Recovery from this disease is never to be expected. Death takes place from slow inanition after an average duration of from twelve to fifteen months. The objects of treatment are palliation of symptoms and the prolongation of life.

For the relief of pain there is no substitute for opium, and the patient is entitled to the relief which this drug can afford. Suffering from indigestion and vomiting may be mitigated by a careful adjustment of diet to the tolerance and the capabilities of the stomach for digestion. The experience in each case is to guide the dietetic treatment. Buttermilk is sometimes better tolerated than any other form of diet. In order to prolong life, it is desirable that nutritious food should be taken as largely as is compatible with proper precaution against pain, indigestion, and vomiting caused by over-ingestion. Nutritive enemas may be resorted to in order to give the stomach temporary rest, and to increase alimentary supplies when the stomach tolerates but little food. In stenosis of the cardiac orifice, rectal alimentation becomes a necessity. Not only may it prolong life, but it affords relief from the sense of hunger. In stenosis of the pyloric orifice followed by dilatation of the stomach, Leube recommends the daily use of the stomach-pump to relieve distress from acidity and distension. This author refers to a case, reported by Friedreich, in which epigastric tumors diminished and enlargement of lymphatic glands above the left clavicle disappeared under the use of cundurango. In other cases it has proved of no value. There can be no objection to making trial of it. Ruehle states that improvement, in many cases, as regards the gastric symptoms and the general condition, takes place under the use of this remedy.[2]

CANCER OF THE INTESTINES.

In the great majority of cases, cancer is seated in the large intestine; usually in either the cæcum, the sigmoid flexure, or the rectum.

Duodenal cancer cannot be differentiated with certainty from cancer of the stomach. As regards the situation and the physical characters of the tumor, the differences are not sufficient for the discrimination. The chief distinctive feature is the constant occurrence of jaundice when the disease is seated in the duodenum, whereas this is only an occasional complication in cancer of the stomach. The differential diagnosis is of no practical importance, since the prognosis and treatment of the disease in either situation are the same.

---

[1] Principles and Practice of Medicine, 4th edition, p. 414.

[2] *Vide* Jahresbericht, von Virchow and Hirsch, 1877, p. 208.

The local symptoms in cases of cancer below the duodenum are, pain, tenderness, diarrhœa, and the presence in the dejections of blood more or less changed in proportion as the affection is situated at a distance from the anus. Cancerous masses have been found in the dejections. To the foregoing symptoms are often added those arising from intestinal obstruction. The general symptoms are essentially the same as in cases of cancer of the stomach.

In the rectum, the disease can be ascertained by digital and ocular examination. Above the rectum, the diagnosis requires that, in connection with the local and general symptoms, a tumor be discoverable. In the sigmoid flexure and cæcum, the cancerous tumor is fixed, but in the small intestine and the transverse colon, if it have not formed attachments from peritoneal inflammation, it is movable, and, from its weight it may descend to the hypogastric region. The tumor is generally irregular in form, and has an uneven or nodulated surface. At the sigmoid flexure and the cæcum, if it occasion obstruction, fecal accumulation takes place above the tumor, so that the size of the latter may not be determinable without the removal of the accumulation by means of saline laxatives. In a case under the author's observation of cancer at the sigmoid flexure, the accumulation above this situation occasioned rupture of the cæcum and fatal peritonitis.

The prognosis in cancer of the intestines is the same as when the disease is seated in the stomach: there is no ground for hopes of recovery. The objects of treatment are the same, namely, to palliate symptoms and prolong life. Palliation requires the liquefaction of fecal contents of the intestine above the seat of the cancer by saline laxatives, in order to remove or obviate accumulation. So far as is consistent with this indication, opiates to relieve pain are indicated. The diet should be as nutritious as possible, and consist of articles capable of being completely digested, leaving but little fecal residuum. Lumbar colotomy is warrantable in cancer of the rectum or situated at the sigmoid flexure, as a palliative measure, and with a view to the prolongation of life.

CANCER OF THE PERITONEUM.

Cancer of the peritoneum in the form of disseminated nodules of small size, is not infrequently a secondary affection in cases of cancerous disease of the uterus, liver, and other abdominal organs. This complication may be suspected if, the existence of cancer in another situation being known, there are present local symptoms which denote chronic peritonitis either with, or without, peritoneal effusion. The diagnosis, if practicable, is not of great importance as regards treatment.

In some instances cancer of the peritoneum is in the form of a tumor or of tumors variable in size, either fixed or movable, generally irregular in form, or nodulated. General symptoms pointing to a malignant disease, and, especially, the coexistence of cancer in another part, establish the diagnosis, or, at least, render it highly probable. Renal cancer is excluded by the absence of symptoms referable to the urine. Ovarian tumor, a distended gall-bladder, a floating kidney, a fecal accumulation, and aneurism are discriminated by the diagnostic evidence of symptoms denoting a cancerous cachexia.

Alveolar, colloid, or gelatinous cancer, originating in the peritoneum, may develop into a large and sometimes an immense tumor. The volume of the abdomen may be further increased by peritoneal effusion. This variety of cancerous disease is to be discriminated from hydroperitoneum by the irregular form of the abdominal enlargement, the sense of resistance on pressure at certain points, the limitation of fluctuation to portions of the abdomen, together with the presence of symptoms which denote a malignant disease. Exploration by means of a small canula or trocar is advisable in order to ascertain the presence and the character of liquid within the peritoneal cavity. If liquid be present, its removal by paracentesis may afford relief, and the abdomen can then be examined with more facility in order to determine the physical characters of the tumor.

The treatment does not differ from that of cancer in other situations.

V.

DISEASES CAUSING GASTRIC AND INTESTINAL OBSTRUCTION.

GASTRIC OBSTRUCTION, DILATATION OF THE STOMACH, INTESTINAL OBSTRUCTION WITH STRANGULATION, TREATMENT OF INTUSSUSCEPTION, TREATMENT OF OBSTRUCTION WITH STRANGULATION NOT CAUSED BY INTUSSUSCEPTION, OBSTRUCTION WITHOUT STRANGULATION, FECAL TUMORS.

The term gastric obstruction is here limited to the pyloric opening, exclusive of occlusion of the cardiac orifice of the stomach. Obstruction in the latter situation has been considered sufficiently in connection with cancer of the stomach and diseases of the œsophagus. Dilatation of the stomach being generally associated with pyloric obstruction, its consideration is naturally therewith connected.

The diseases causing intestinal obstruction may be divided into two groups. In one group are embraced affections which, in addition to obstruction, cause strangulation. The other group includes affections in which obstruction exists, without strangulation. These two groups will be considered under separate headings.

Gastric Obstruction. Dilatation of the Stomach.

Cases of carcinomatous disease have been reported in which the stomach was contracted at or near the middle of the organ (hour-glass conction), but these cases are exceptional, and the seat of the obstruction nnot be diagnosticated. Practically, therefore, when gastric obstruc- on exists, the impediment is either at or near the pylorus. It may be little above or a little below, in the latter case being within the duo- lenum. The disease which most frequently causes pyloric stenosis is cancer. Next to this in frequency is ulcer, or, more properly, the cicatrix of an ulcer seated either at, above, or below the pyloric orifice. Hypertrophy or hyperplasia of the fibroid tissue (sclerosis, induration, linitis) comes next in frequency, and lastly, obstruction may be caused by polypoid, myeloid, or other tumors, or by an enlargement of the pancreas.

If the pyloric obstruction be sufficient only to delay the passage of the contents of the stomach into the small intestine, it occasions a sense of fulness or distension, and the symptoms which denote chemical changes of the ingesta. These effects would hardly suffice for the diagnosis. A greater degree of obstruction leads to an accumulation of ingesta resulting in vomiting, the matters vomited consisting of food partially digested, together with sometimes blood in the form of coffee grounds if the obstruction be due to cancer, and with mucus if there be gastritis. Vomiting occurs after intervals which allow an accumulation of food, that is, from one to three days, and the quantity of matters vomited at each recurrence is large. These are diagnostic points which relate to the obstruction; they are not present if vomiting be excited by cancer or ulcer irrespective of an existing stenosis. Sooner or later, dilatation of the stomach ensues. This result follows precisely as the bladder becomes dilated from an enlarged prostate, or as hypertrophy of the heart is induced by an over-accumulation of blood within the cardiac cavities. The symptoms and signs of dilatation of the stomach thus constitute the evidence of the existence and the degree of obstruction.

The dilatation in some cases is enormous. The stomach has been found to occupy the greater part of the abdominal space, and to cause an extended enlargement simulating in appearance pregnancy or peritoneal dropsy, for each of which it has been mistaken. These errors of diagnosis are to be avoided, first, by taking proper cognizance of the vomiting together with other gastric symptoms, and, second, by excluding pregnancy and dropsy. Pregnancy is excluded by the absence of its diagnostic symptoms, and of the fœtal heart-sounds. Dropsy is excluded by the fact of the abdominal enlargement beginning and being most marked at the upper, instead of the lower, part of the abdomen, and by the absence of circumstances pointing to cirrhosis of the liver, the latter being causative of hydroperitoneum in the great majority of cases.

The symptoms and signs, in cases of great dilatation dependent on pyloric obstruction, are as follows: vomiting, resulting from an accumulation of ingesta, occurring at intervals of several days, the matters vomited very large, consisting of food partially digested, frequently containing sarcinæ, and the occurrence of chemical changes as evidenced by intense acidity and an acrid character of the egesta. The ejection of the contents of the stomach is followed by a sense of relief, and a perceptible diminution of the abdominal enlargement. Dyspnœa is sometimes caused by the accumulation of ingesta, the diaphragmatic movements being thereby restricted. Prior to the ejection of the contents of the stomach, percussion generally gives a gastric tympanitic resonance over a large area, and, below this resonance, flatness. The tympanitic resonance extends lower when the patient is recumbent than when the body is vertical, owing to the change of the level of the liquid contents. With the ear or stethoscope applied over the abdomen, an amphoric sound may follow the swallowing of liquid. Splashing is produced by succussion, as in cases of pneumo-hydrothorax, and it may accompany movements of the body, but this sign is not uncommon when gas and liquid are contained in the stomach without dilatation; it is more constant and marked when the latter exists.

A physical method of diagnosis, indicated by Leube, is the introduction into the stomach of a probang, and observing the length of the instrument which can be passed without meeting an obstruction. The end of the probang can sometimes be felt through the abdominal walls, and the lower boundary of the stomach in this way ascertained. This method should not be employed if symptoms of gastric ulcer be present, nor if the operation cause in the mind of the patient much alarm or excitement.

The symptoms, not referable directly to the stomach, but attributable to the pyloric obstruction, represent the effects of defective assimilation. The gastric contents passing with difficulty into the small intestine, the blood derives from the latter proportionately restricted supplies. Moreover, the movements of the muscular coat and the secretion of the gastric glands are diminished by the dilatation; hence, stomach digestion is imperfect. The consequences are emaciation and muscular debility. The bowels are constipated as a result of the small quantity of fecal contents; the urine is scanty from a deficient supply of water to the blood, and its reaction is often alkaline. To these symptoms are to be added those which relate to the character of the disease producing the obstruction, especially if the disease be cancer.

Dilatation of the stomach is not always associated with obstruction at the pylorus. It is sometimes an effect of degenerative changes of the muscular fibres of the organ, and of paralysis without lesion. The gastric walls become dilated from an accumulation of ingesta which are not propelled into the duodenum in consequence of weakened peristaltic movements. The affection is far less grave than when it depends on stenosis, and it is tolerated indefinitely, whereas the effects are serious in proportion to the degree of obstruction when the latter coexists. Moreover, dilatation without stenosis admits of improvement and possibly of cure.

Treatment of Gastric Obstruction and Dilatation.

The most important part of the treatment relates to diet. The food should be restricted to articles which are found by experience, in each case, to be most readily digested, and which are least likely to occasion the development of gas. Probably, in most cases, tender meats, either in substance or in concentrated broths, are best suited to serve as the staple of diet. The quantity taken should be graduated as near as possible to the digestive capability of the stomach. Pepsin and hydrochloric acid may be useful by promoting digestion. Remedies to increase the muscular power of the stomach are indicated. Strychnia or nux vomica best fulfils this indication. Saline cathartics may be tried. In order to obviate the evils arising from the excessive accumulation of ingesta, provided spontaneous vomiting do not take place, emetics are advised. As a more ready and less perturbating method, the withdrawal of the contents of the stomach by aspiration has been advocated by Kussmaul. The stomach-pump is best suited for this purpose. Kussmaul, Leube, and others recommend that the stomach be systematically emptied whenever the accumulation occasions inconvenience; and it is claimed that not only is this mode of treatment productive of relief, but it is followed by improvement, and may effect a cure of dilatation not dependent on pyloric obstruction. The principle is the same as when the catheter is employed to obviate distension of the bladder. There is, however, this important difference: the contents of the bladder are excrementitious, whereas the alimentary contents of the stomach are for appropriation. It is obviously not desirable that aliment should be withdrawn which, if allowed to remain, would be assimilated. This consideration suggests the exercise of judgment in the use of the stomach-pump. If the degree of pyloric obstruction be such that life is endangered from innutrition, rectal alimentation is to be resorted to. It may, perhaps, be useful, when dilatation is not associated with stenosis, to nourish the patient for a time wholly by the rectum. The mechanical support of an abdominal bandage is of use. Leube has found the constant galvanic current, applied to the epigastrium, serviceable in giving tonicity to the muscular coat of the stomach.

INTESTINAL OBSTRUCTION WITH STRANGULATION.

The affections belonging in this group are intussusceptions, constrictions, in various modes, by peritoneal bands, incarcerated protrusions either through apertures in the omentum, mesentery, the diaphragm, the suspensory ligament of the liver, the broad ligament of the uterus, etc., or in spaces caused by the attachment of the end of the vermiform appendix, and diverticula of the ileum to adjacent parts, internal hernias in different situations, and twisting of a portion of intestine so that it becomes strangulated.[1]

There are certain characteristics common to all these affections, provided they occasion both obstruction and strangulation. These characteristics are essentially those of strangulation in a situation accessible to examination. The obstruction is nearly or quite complete. It occurs together with strangulation, either suddenly or without any disturbances which foreshadow what is to follow. A localized pain with exacerbations suggestive of colic, is the primary symptom. Its significance for twelve hours or longer cannot always be determined. Opiates fail in affording complete relief. After more or less fecal matter has been evacuated, the dejections cease. Purgatives, which are unfortunately often given prior to a diagnosis, produce no cathartic effect. Vomiting soon occurs. The matters vomited are ingesta, bile, and, after a time, the contents of the small intestine, having a stercoraceous odor. The abdomen becomes tympanitic from the accumulation of gas in either the large or small intestine, or in both, according to the seat of the obstruction. Localized tenderness is more or less marked. The distension of the abdomen frequently interferes with respiration by limiting the descent of the diaphragm. The pulse becomes frequent and small. The surface is cold and often covered with clammy perspiration. The patient falls into a condition of collapse, and death takes place within a period varying from a few hours to a fortnight, the average duration being less than a week. The mental faculties usually remain intact.

---

[1] For a full account of the numerous ways in which obstruction with strangulation is produced, *vide* article by Leichtenstein, in Ziemssen's Cyclopædia, Am. ed. vol. vii.

The first point of inquiry in regard to diagnosis should always be, whether a hernia exists in a situation accessible to examination. The inguinal, femoral, and other regions in which external hernias may occur, are to be carefully examined. Omitting this duty, a small hernia, the existence of which is not suspected by the patient, may prove fatal, when, if timely discovered, surgical interference would probably have prevented death. A case illustrative of this fact has fallen within the author's knowledge.

Peritonitis from intestinal perforation is to be excluded. This is not always easy, except in cases of intussusception. The differential diagnosis must be based mainly on the absence of the evidence of diffused peritoneal inflammation. Practically the discrimination is not of great consequence, in view of the uniformity in prognosis and the principles of treatment.

With due attention, acute gastritis caused by corrosive poisons should be easily excluded, and also epidemic cholera. It is stated that intestinal obstruction with strangulation has been mistaken for each of these affections.

It is beyond the reach of diagnosis to determine, in individual cases, the particular affection, other than intussusception, which is causative of the obstruction and strangulation. Nor is the fact of strangulation always easily determined. Some cases of obstruction to which reference will be made in connection with functional disorder of the intestine, are accompanied by pain, vomiting of intestinal contents, and other symptoms pointing to the existence of some one of the different affections embraced in this group.

A judgment may be formed concerning the seat of the affection. If it be seated at or near the sigmoid flexure, the fecal evacuations prior to the discovery of the fact of obstruction are small; and, in addition to the situation of pain and tenderness, the abdominal distension may be referred by palpation to the descending, transverse, and ascending colon. On the other hand, its situation at the lower part of the ileum or the cæcum is shown by the abundant dejections before obstruction is manifest, and the limitation of the tympanites to the small intestine, together with the seat of pain and tenderness. Seated at the upper part of the small intestine, the vomiting is comparatively less in quantity, the abdominal enlargement is slight or wanting, and, as pointed out by Barlow, the urine is scanty owing to the restricted absorption of fluids.

The diagnosis of the most frequent of the affections causing obstruction with strangulation, namely, intussusception, can often be made with positiveness. For this reason, and, also, on account of the success which may attend the treatment, it claims separate consideration.

Diagnosis of Intussusception.

Intussusceptions in which the invaginated intestine does not become incarcerated and strangulated, cannot be diagnosticated. Inasmuch as they are not infrequently found after death, especially in young subjects, it may be inferred that they occur, restorations taking place without any serious disturbance. The diagnosis as well as the danger relates to obstruction and strangulation incident to the intussusception.

Age is to be considered in the diagnosis. In half the cases which occur, the age is under ten years, and in one-fourth the age is between the third month and the end of the first year after birth.[1] It occurs oftener in males than in females, during infancy, as well as at all periods of life. The situation in which the intussusception most frequently takes place, is also to be considered. It occurs in a proportion of over fifty per cent. at the junction of the cæcum and ileum. A portion of the ileum descends through the ileo-cæcal opening, and not infrequently afterward the cæcum and more or less of the ascending and transverse colon become invaginated. Intussusception of the small intestine is extremely rare. If not ileo-cæcal, it is generally situated at the sigmoid flexure or the descending colon.

The diagnostic symptoms which have been stated as pertaining to the various affections causing obstruction and strangulation, are present, namely, colic pains occurring without premonition, vomiting, diarrhœal evacuations prior to the manifestation of obstruction, tympanitic distension of the abdomen, frequency and feebleness of the pulse, coldness of the surface, and, in fatal cases, collapse, the duration varying from a few hours to about a week. When death takes place within a few hours, it is apparently from what is known as shock. The evidence that these symptoms denote intussusception is as follows: Bloody mucus or pure blood is passed from the rectum. This is a highly characteristic symptom, excluding dysentery and ascertaining by examination that the blood is not derived from hæmorrhoids or polypoid growths accessible to observation. Tenesmus is frequently marked, and this symptom in conjunction with the discharge of bloody mucus, may, without care, lead to the error of mistaking the affection for dysentery. An examination by the touch and speculum may disclose within the rectum the presence of invaginated intestine, and it sometimes protrudes from the anus. This demonstrative diagnosis is practicable in some cases when the intussusception is seated in the descending colon and even at the cæcum: instances have occurred in which the latter has been visible. The inability to inject much liquid into the rectum, and its forcible return, showing an obstacle at a short distance above the anus, are significant, when the invaginated intestine is above the seat of digital or ocular examination. On examination of the abdomen by the hand, often a tumor is discoverable, elongated, resisting and tender on pressure, situated in the region of the cæcum, in the direction of the transverse or descending colon, and, sometimes in the hypogastrium.

---

[1] Analyses of 479 cases, by Leichtenstein, *op. cit.*

With more or less of the foregoing points in evidence, the existence of intussusception can be positively determined. But these points are not available at the outset. Some hours, at least, must elapse before a positive diagnosis is practicable. Moreover, in some cases intussusception exists without complete obstruction. The intestinal canal either remains pervious or becomes so after the inflammatory condition has subsided. The affection may then exist in a chronic form, and may remain for several months. These cases, however, are extremely rare.

Treatment of Intussusception.

With reference to the objects of treatment, the facts concerning spontaneous recovery are important. The invaginated portion of intestine may be restored without any measures having been employed for that end. The probability of this, however, is so small, after the symptoms of strangulation have appeared, that it is entitled to no weight in connection with the treatment. If this method of cure do not take place spontaneously, and if it be not brought about by measures employed for that end, assuming the obstruction to be complete, there remains but one mode of recovery, namely, the separation of the invaginated portion of intestine by sloughing, the adhesions at the point of the invagination being sufficient to prevent any escape of intestinal contents into the peritoneal cavity. A considerable number of cases have been reported in which recovery has taken place in this way. The author, in another work, has cited two remarkable instances observed by two of his colleagues; in each case several feet of intestine having been evacuated per anum.[1] The objects of treatment, therefore, are twofold, namely: *first*, to effect, if possible, restoration of the invaginated portion of intestine; and, *second*, if restoration be impossible, to promote separation by sloughing, and permanent adhesion at the point where the invagination occurred.

As soon as the diagnosis is established, it is proper to make efforts for restoration by pressure from below. The intestine may be distended by water or air. The latter is to be preferred, but both may be tried. The injection of air or liquid into the rectum should be continued until as much distension is produced as is comfortably borne, and the abdomen should be gently kneaded during and after the injection. Care is requisite not to continue the injection too long nor to use much force, lest rupture of the bowel be produced—an accident which has occurred. Cases have been reported in which this method of reduction has proved successful. In some of these cases there is ground for distrusting the correctness of the diagnosis. The prospect of success is small, and, other things being equal, it is less in proportion to the time which has elapsed before the effort is made. When, from the duration of the intussusception and the symptoms, there is reason to think that gangrene has taken place, the injections should not be employed, inasmuch as, if successful, the only chance of recovery is destroyed, namely, the sloughing away and discharge per rectum of the invaginated intestine. Before injecting air or liquid, the contents of the lower bowel should be removed by an enema. Prof. J. Lewis Smith has reported a case in which the intestine was distended with carbonic acid gas, injected by means of an India-rubber tube attached to siphon bottles of water highly charged with this gas.[1]

---

[1] Principles and Practice of Medicine, 4th edition, p. 421.

If the foregoing method fail, the propriety of abdominal section (laparotomy), in order to restore the invaginated intestine with the fingers, is to be considered. The objections to this operation are, *first*, it is in itself attended with considerable danger from the liability to general peritonitis as a consequence, and, *second*, when the diagnosis is established, and efforts for restoration by the preceding method have been unsuccessfully employed, the feasibility of restoration is doubtful, owing to adhesions; nor is restoration desirable on account of gangrene probably having taken place. These considerations have made surgeons reluctant to perform the operation. This reluctance has of late somewhat diminished, since the large abdominal sections, in cases of ovariotomy, have shown that there is much less danger from the operation itself than has heretofore been supposed. The operation proved successful in 7 out of 20 reported cases tabulated by Professor H. B. Sands. Professor Sands has reported a case in which the operation was performed by himself with success. The patient was an infant six months old, and laparotomy was practised within eighteen hours from the attack, after efforts for restoration by the injection of air and water had been partially successful. The invaginated mass consisted of the cæcum and a portion of the ileum projecting through the ileo-cæcal aperture.[2]

The success of the operation depends on its early performance. It will in all probability not prove successful if delayed over twenty-four hours after the occurrence of symptoms denoting the intussusception. It is the more admissible in infants from the fact that, in them, the cure by the separation of the invaginated intestine is not to be expected; death takes place before the process of sloughing is completed. After the infantile period, the chances of recovery from the separation of the invaginated intestine are not insignificant; and it is to be considered that these chances are lost if laparotomy be employed, and it be found either that the intestine cannot be restored or that it is in a gangrenous condition.

It is superfluous to say that purgatives conflict with measures to effect restoration. They tend to increase the invagination, and their use, prior to the diagnosis, is to be regretted. A good practical rule, in all cases of abdominal pain, is to avoid purgative remedies until the character of the affection is determined. This rule is the more to be commended from the fact that—in affections for which intussusception may be mistaken at the outset, namely, functional colic and peritonitis—cathartics are hurtful.

---

[1] *Vide* Diseases of Children, 2d edition, 1872.

[2] *Vide* New York Medical Journal, June, 1877. In this article the reported cases are tabulated, and the merits of the operation discussed.

Cathartics are contraindicated after, as well as before, the time for efforts for restoration has passed. They interfere with the adhesions which are essential to recovery. They may determine a fatal termination which otherwise would not have occurred. On the contrary, measures to arrest peristaltic movements are important. For this object opium is indicated. Opiates, in doses sufficient to relieve pain, constitute the most important of the measures for the second object of treatment, that is, to promote the sloughing away of the invaginated portion of intestine and preventing the escape of the intestinal contents into the peritoneal cavity. They are to be given as freely as possible without incurring risk of narcotism. They are to be employed precisely as in cases of acute peritonitis from intestinal perforation. They are to be continued until sufficient time has elapsed for the separation to take place, the maximum period being about three weeks.

Sustaining measures are indicated in order to prolong life until the separation takes place. The diet should consist of concentrated food which, after digestion, leaves but little fecal residuum. Strong animal broths, with the addition of farinaceous preparations, should constitute the diet, except the patients are nursing infants. Milk, however, is to be substituted, if preferred by the patient, and found to be more readily digested. Absolute quietude is to be enjoined. The soothing effect of warm applications to the abdomen is useful. Alcoholics are to be given in proportion as the symptoms denote asthenia, the quantity to be regulated by their immediate effects.

Treatment of Obstruction with Strangulation not caused by Intussusception.

In cases of obstruction with strangulation, in which the diagnostic symptoms of intussusception are wanting, laparotomy is admissible. The constricting cause may be discovered and removed, or an internal hernia may be reduced, and life thereby saved. The objections are the difficulty of the diagnosis until it is too late, and the danger incident to the operation. Its success depends on its not being deferred until sphacelation has taken place. With regard to the prospect of success, an accumulation of facts larger than medical literature now affords is desirable.

Irrespective of this operation, the only ground of hope is that the conditions causing the obstruction and strangulation will spontaneously cease. Cathartics are contraindicated, and the principles of treatment are the same as in cases of intussusception.

For the relief of tympanites, when excessive, in all cases of obstruction with strangulation, the application of ice to the abdomen is strongly recommended by Jaccoud.[1]

OBSTRUCTION WITHOUT STRANGULATION.

Various affections cause obstruction unaccompanied by conditions by which a portion of intestine is strangulated. The effects, without the latter, are produced simply by mechanical occlusion more or less complete. The latter is either temporary or permanent. These affections may be seated outside of the intestinal walls or within the canal. The external causes act by compression. The most frequent of these are carcinomatous or other tumors, so situated as to diminish or close the canal by pressure. Morbid growths in the walls, and the contractions which follow the cicatrization of ulcers, diminish the calibre of the intestine. Tumors sometimes project from the mucous surface into the canal; much oftener, however, obstruction from within is caused by gall-stones (choleliths), intestinal concretions (enteroliths), foreign bodies swallowed by accident or voluntarily, accumulation of indigestible constituents of food, *e. g.* fruit seeds, remedies such as bismuth, chalk, magnesia, and fecal masses.

---

[1] Pathologie Interne, Paris, 1871, tome ii. p. 356.

The morbid effects are induced slowly. They arise from the detention of the intestinal contents above the seat of the obstruction which may be situated at different points in the course of either the large or the small intestine. These effects, however, may be associated with others which arise from the affection causing the obstruction, especially if the latter be cancer.

Before the obstruction becomes complete, if it be considerable, the dejections are loose, or they consist of fecal matter in small lumps which are moulded by passing through the contracted portion of intestine. The patient, for a greater or less period, suffers only from inconveniences such as attend obstinate constipation when it is purely functional. Complete obstruction, which may be temporary or permanent, may be produced by the impaction in the contracted portion of intestine of indigestible constituents of the intestinal contents, or, in the large intestine, by a mass of hardened feces.

The first point in the diagnosis is to determine whether there be anything more than functional constipation. If the latter only exist, the judicious employment of cathartics or enemas will be likely to procure complete relief. These measures prove ineffectual, or procure only temporary relief, if there be obstruction from a structural affection. Other evidence of the latter than is afforded by the quantity and character of the dejections, is then to be sought after. An obstruction within the rectum is ascertained by digital and ocular examination. If not seated in this portion of the large intestine, the abdomen is to be examined externally for a tumor. If a tumor be found in the tract of the large intestine, the question arises whether it be external to the intestine, or a fecal accumulation. The differential points will be presently considered under the heading, fecal tumors. This question does not, of course, arise if, from the situation of the tumor, it be not in relation to the large intestine. Certain structural affections are not appreciable by palpation, for example, thickening of the intestinal walls, and constriction from a cicatrix.

Knowledge of the seat of the obstruction may generally be obtained by an examination of the abdomen. If seated at the sigmoid flexure or at any point between this situation and the cæcum, the distension of the intestine above the obstruction is appreciable by palpation. Seated a the cæcum or the lower part of the ileum, it is evident on palpation tha the abdominal enlargement is not caused by distension of the large inte tine ; the latter, if distended could be felt. In proportion as the obstru tion is near the stomach, the abdomen is less enlarged.

The quantity of intestinal contents which accumulate, depends, of course, other things being equal, on the seat of the obstruction; the lower the situation, the larger the space for accumulation. The tolerance, however, varies much in different cases, depending on the character of the contents, the chemical changes which take place, and other circumstances. As a rule, the lower the seat of the obstruction, the better and longer the tolerance.

When there is occlusion, either from the continued progress of the obstructing affection or from plugging of the contracted space, it is a question only of time as regards certain effects. There is progressive increase of suffering from distension due to accumulation of ingesta and tympanites. Vomiting ensues after a variable period, the more speedily the nearer the seat of the obstruction to the stomach. The matters vomited are derived in part from the small intestine, and may have the characters which are called stercoraceous. Digestion and assimilation are more and more impaired. Respiration is impeded by pressure upon the diaphragm from below. Emaciation and debility are in proportion to these effects. Ulceration, especially in the large intestine, may occur, and perforation, followed by peritonitis, either as a result of ulceration or of rupture from distension, may prove the immediate cause of death. If this event do not take place, the case ends fatally, sometimes rapidly and sometimes slowly, by asthenia.

Obstruction, not amounting to occlusion, may be tolerated indefinitely, if the causative affection be not in any other way injurious. The author has reported a case in which a tumor in the iliac region was known to have existed for twenty years, the patient suffering at times from incomplete obstruction, and finally dying from pneumonia; the obstructing cause being found, after death, to be an enterolith, cuboid in form, with a vertical and transverse diameter of one inch and a half, and situated just above the cæcum.[1] In connection with functional obstruction, cases will be referred to in which an accumulation of intestinal contents was tolerated for several months, fecal evacuations having been suspended for so long a period.

Treatment of Obstruction without Strangulation.

In cases of obstruction without strangulation, in which the obstructing cause is not removable, the treatment has reference to two objects, namely, *first*, to nourish the body with food as completely digestible as possible so as to leave but little fecal residuum, and, *second*, to soften or liquefy the intestinal contents above the seat of the obstruction. For the first of these objects the diet should consist of tender meats, nutritious broths, milk with the addition of lime-water, and farinaceous articles. Vegetables which contain indigestible constituents should be interdicted. If meat be taken in a solid form, portions of gristle should be carefully removed. The rind, stones, or seeds of fruit are also to be avoided. The author has recently met with a case in which fatal occlusion was caused by the plugging of a constricted space by the skin and seeds of an apple, the patient having previously not suffered great inconvenience from the constriction. Here is one of the exceptional instances in which it is not safe to trust to the instincts for the regulation of diet.

---

[1] Principles and Practice of Medicine, 4th edition, p. 428.

For the second object, laxative medicines are indicated. The salines are in general to be preferred, since they can be best graduated to the amount of laxative effect required, and their operation is chiefly due to the watery transudation which they produce. All active cathartics are contraindicated. The patient may desire them in order to relieve a sense of fulness or distension; and the physician is sometimes led to employ them with the hope of overcoming what may appear to be obstinate constipation. By irritating the mucous membrane and exciting peristaltic movements unduly, they are likely to do harm. Castor oil, in small doses repeated at intervals of from three to six hours, is a safe and sometimes an efficient laxative, with a view to soften and effect the removal of an existing fecal accumulation. Large draughts of simple water, taken on an empty stomach, may prove sufficient in some cases.

These measures of treatment having reference to the second object, are indicated so long as there is obstruction greater or less in degree, but not occlusion, from causes which are not removable. When an obstruction, which is complete or nearly so, must continue, the only resource is colotomy. This operation is, of course, indicated only when the occlusion is seated either at the rectum, the sigmoid flexure, or at some point in the course of the descending and transverse colon. Inaugurated about forty years ago by Amussat, it seems to have found but little favor with surgeons until within the past few years. Unattended by much danger, if the peritoneum be not wounded, it not only affords a relief which cannot be otherwise obtained, but, if the cause of the occlusion be not a source of danger irrespective of the obstruction, it offers a prospect of an unlimited prolongation of life without even involving great inconvenience. Professor Erskine Mason—in an elaborate article containing an account of six cases of the operation performed by himself, a tabulated analysis of eighty cases reported since 1853, and forty-four cases, reported prior to that date, collected by Carson H. Hawkins—says of the operation as follows: "If this article should be the means of calling the attention of our profession more fully to the subject, and of inducing them to resort to the operation more frequently than they have hitherto done, we feel sure that they will confer a great blessing upon many of their patients, and we will thus be repaid for any labor we have expended in its preparation."[1]

FECAL TUMORS.

Tumors formed by masses of feces claim a separate notice for two reasons: first, from the liability of confounding them with cancerous growths; and, second, because they are removable by judicious treatment.

The symptoms are those of intestinal obstruction in a greater or less degree. A tumor is discovered by palpation at some point in the tract of the large intestine. The question then arises, is it a fecal tumor

---

[1] *Vide* Amer. Journal of the Med. Sciences, October, 1873.

The data for an affirmative answer are as follows: As a rule, the tumor is not sensitive to pressure. There are exceptions to this rule; the author has met with cases in which there was much tenderness on pressure. On the other hand, cancerous tumors, not accompanied by local peritonitis, may be devoid of tenderness. Fecal tumors are variable in size and form; but, this is also true of those that are cancerous. Fecal, are less resistent to pressure than cancerous, tumors; their situation can sometimes be changed by pressure made for this purpose in the direction of the large intestine; they may be indented and their form changed by firm, prolonged pressure. These are the differential points so far as they relate to the evidence obtained by palpation. The inadequateness of these points for a positive diagnosis is shown by the fact that physicians of large experience have met with cases in which, after careful examination, they are in doubt, or, if they venture a decided opinion, it has proved erroneous. It is therefore a prudential rule to await the effect of measures of treatment based on the supposition that the tumor is fecal, before committing the judgment decisively. If the tumor be fecal, unless it have the character of an intestinal concretion or enterolith, judicious, persistent measures for treatment will cause it to disappear. The presence or the absence of general symptoms indicative of a malignant disease is to be taken into consideration; but these are not at all times reliable, as the author can testify from his own observations.

Treatment of Fecal Tumors.

The object of treatment is to lessen or liquefy the feculent mass, so that it will be propelled onward by the peristaltic movements and be discharged. Active cathartics will not be likely to accomplish the object, and may do harm. Saline purgatives or an emulsion of castor oil, in small or moderate doses given after intervals of a few hours, will lead to softening or the liquefaction of the upper portion of the mass. The lower portion may generally be reached by injections administered through a flexible tube carried upward to the sigmoid flexure. The injections may be repeated three or four times daily. They serve a twofold purpose, namely, the liquid softens the tumor, and facilitates its passage onward by distending the intestine below it. As much liquid should be injected as may be borne without discomfort, and it should be retained as long as possible. If the quantity be so large that it is quickly returned, the object is not accomplished. The liquid used may be either simple water, or thin barley water. An unirritating liquid is tolerated longest. The author has known olive oil to answer extremely well. Perhaps the addition of ox-gall is of service in promoting the softening or liquefaction. Cathartic substances, and even common salt, should not be added to the liquid.

This treatment may be employed tentatively when it is doubtful if the tumor be fecal, and its success, of course, establishes the diagnosis.

DISEASES OF THE GASTRIC AND INTESTINAL GLANDS.

Diseases seated in the glands which secrete the gastric and the intestinal juice, the efficient agents in digestion, are, as yet, not embraced in the nosology, and are generally not considered by writers on practical medicine. The researches, however, of Handfield Jones, Wilson Fox, Samuel Fenwick, and others, have demonstrated in these glands degenerative changes analogous to those which occur in other glandular organs, for example the kidneys. It would be a strange anomaly were these glands, furnishing a secretion daily amounting to more than the weight of the blood, and which is essential to the processes involved in assimilation, exempt from different forms of disease. Diseases of these glands will at some future time hold an important place in pathology. In the existing state of our knowledge, the data are wanting for determining whether diseases now referred to other situations are not primarily seated in this vast glandular system; also to what extent functional and structural affections of this system are developed secondarily in diseases originating elsewhere. The symptoms and signs of pathological conditions referable to these glands, are yet to be fully determined. It may be conjectured that anorexia and defective digestion have a special relation to diseases of the gastro-intestinal glands. A probable diagnosis may be based on persistent loss of appetite, and of the digestive function, without evidence of other diseases in the stomach or other parts of the body. This is true of some cases now known as idiopathic or pernicious anæmia. Fenwick has reported a case in which the diagnosis, based on the points just stated, and the exclusion of other diseases, was verified by microscopical examination after death.[1]

VI.

FUNCTIONAL DISEASES OF THE STOMACH AND INTESTINES.

GASTRALGIA, ENTERALGIA, GASTRO-ENTERALGIA, COLIC FROM LEAD, INTESTINAL COLIC.

FUNCTIONAL diseases are those which do not involve either inflamma
or appreciable lesions, as constant and essential. If either be invol
it is accidental, or it is not from a necessary pathological connec
This statement applies to all functional diseases.

The diseases of the stomach and intestines, embraced in this div
are the neuralgic affections, gastralgia, enteralgia, and gastro-enter
intestinal colic, disorders of digestion, and functional anorexia; vo
diarrhœa, constipation, functional obstruction of the bowels, spa
cholera, and cholera infantum.

---

[1] London Lancet, July 16, 1870, *vide* article by the author on "The Pat
Relations of the Gastric and Intestinal Tubules," New York Medical Journa
1871. For several lectures on Atrophy of the Gastric Glands by Fenwick,
don Lancet, numbers in July, 1877.

Intestinal parasites are to be included in this division. The list might be extended by the addition of pyrosis and gastrorrhœa, gastrorrhagia (hæmatemesis), and enterorrhagia (melæna). These have been considered among the observations preliminary to this section (*vide* pages 252–257).

GASTRALGIA.

Gastralgia is characterized by pain localized in the region of the stomach, but shooting thence to the back and in other directions. It is presented in two forms, which may be distinguished as acute and chronic gastralgia.

In acute gastralgia, the pain occurs in paroxysms. The intensity of the pain is great. It is peculiarly subduing, and in severe paroxysms is almost insupportable. The strongest endurance gives way; the patient writhes and cries out with the severity of suffering. With the pain there is sometimes a feeling of constriction which may be compared to the imagined sensation of tearing by the claws of an animal. From this character it has been called cramp in the stomach. Vomiting may occur, but it is by no means a constant symptom. The surface is cold, and covered with clammy perspiration. It is stated that syncope and convulsions are sometimes produced, but they have not occurred in any case which the author has observed. The duration of a paroxysm varies from a few moments to several hours.

Acute peritonitis is excluded by the localization of the pain, by apyrexia and the absence of abdominal tenderness. Frequently the patient obtains some relief from pressure over the epigastrium made by the hands or by lying upon the abdomen with a pillow placed beneath the region of the stomach. Vomiting, if it be present, is not sufficiently prominent as a symptom to denote the ingestion of an acid or corrosive poison. The only difficulty in the diagnosis relates to the differentiation of the affection from the pain caused by the passage of gall-stones or hepatic colic. The latter affection will be considered in connection with diseases of the liver. Its diagnostic symptoms have these points of difference: the situation of the pain is not the same; vomiting is more frequent; the frequency of the pulse is diminished in many cases, and the obstruction to the passage of bile is shown by its presence in the urine or jaundice. It must be confessed that, for a time, in some cases, this differential diagnosis cannot be made with certainty.

Diagnostic points are sometimes derived from the etiology. A paroxysm may follow a dietetic excess. Owing to an idiosyncrasy which is known from past experience, the attack is referable to a particular article of diet. The author has met with an instance in which an attack was repeatedly caused by eating honey. A dietetic causation, however, is by no means the rule. A gouty diathesis has some weight in the diagnosis, as the affection occurs in persons subject to gout sufficiently often to show a pathological connection.

The efficacy of treatment establishes the diagnosis. A paroxysm is promptly brought to an end by opiates given in sufficient doses at proper als. The hypodermic injection of a solution of morphia is un-edly the quickest method of procuring relief. A salt of morphia d dry upon the tongue is promptly efficacious. A half grain may iven at a dose to an adult, and repeated in half an hour if the pain not arrested. Alcoholic stimulants should be given if they do not duce vomiting. Sinapisms and hot fomentations may be applied over e epigastrium. Warmth to the extremities may be restored by bottles f hot water or heated bricks applied to the feet and legs. These neasures will alleviate, but will not succeed in procuring complete relief, n cases of hepatic colic.

The intervals between these severe paroxysms of gastralgia are very variable. There may not be recurrence, or paroxysms may recur after intervals of days, weeks, months, or years. In exceptional cases they recur at regular intervals. This fact points to malaria as a probable cause. They have been observed to recur regularly at the periods of menstruation. Quinia, or other antiperiodics, are indicated whenever there is reason to suspect a malarial causation. The preventive treatment, in other cases, consists in avoiding the dietetic or other causes to which attacks have seemed to be attributable, and in the employment of measures to place the general health in the best possible condition.

In subacute and chronic gastralgia the pain is much less intense, but the intensity varies greatly in different cases. Cases also differ greatly as regards the duration of the pain and the frequency of its occurrence. The affection may, or may not, be accompanied by labored or disordered digestion. As a rule, the pain is not excited by the ingestion of food, but, on the contrary, it is thereby relieved. Patients sometimes find instant relief from taking food, and carry with them some article of diet in order to obtain relief in this way. Notable mental depression is a very constant symptom. A physician who consulted the author stated that he was often impelled to suicide. The affection rarely occurs under adolescence or in advanced life.

Ulcer and cancer of the stomach are excluded by the absence of vomiting, of hemorrhage, and by the want of connection between the pain and the ingestion of food. The author has met with a case of duodenal ulcer, in which paroxysms of pain resembled those of gastralgia, and, from the absence of the diagnostic symptoms of gastric ulcer, the affection was considered to be neuralgic. A distinguished physician who saw the case subsequently, made a correct diagnosis based on the occurrence of hemorrhage, the blood not vomited, but passed by the bowels. Vomiting o blood had previously occurred in this case. The absence of the diagnosti evidence of intercostal neuralgia (*vide* page 146) suffices to exclude th affection. With a knowledge of the diagnostic characters of gastritis a gastralgia, these affections can rarely be confounded.

Treatment of Chronic Gastralgia.

With reference to preventive treatment, a possible causative conn of the affection with articles of diet should be a matter for inquiry, liability to error in tracing different affections to dietetic causes me in mind. Patients are apt to fall into error in this regard reasons, namely, it is a popular notion that most diseases of the digestive system proceed from dietetic causes, and, whenever suspicion falls upon a particular article of diet, the expectation of a certain effect may determine its occurrence. Undoubtedly, however, in some cases gastralgia is induced by a faulty alimentation. The dietetic cause is rarely, if ever, an excess of food, but rather a restriction to certain articles of diet, especially those of the farinaceous group, or, in other words, a diet not sufficiently varied. A diet nutritious, abundant, and embracing a proper variety of food, is an important part of the treatment. The habits of the patient as regards the improper use of wine, spirits, and tobacco, are to be considered.

The disease is often associated with anæmia, especially in women. This claims appropriate treatment. Dyspeptic ailments do not always coexist. These, or other deviations from health which may be found, are to be considered and treated as having either a direct or an indirect causative connection with the disease. In a patient subject to gout, a pathological connection with that disease is probable, and this should influence the treatment.

For the palliation of pain, opium should be employed with great reserve, on account of the risk of the seductive influence of this drug. It may be prescribed occasionally when the pain is unusually great, but the physician incurs a grave responsibility in advising or sanctioning its habitual use. This is one of the diseases in which the "opium habit" is readily formed, and the importance of this fact is not to be overlooked. Bismuth in full doses, namely, from twenty to thirty grains of the carbonate, is often an efficient palliative remedy. Indeed, it sometimes proves curative.

A curative remedy, in the author's experience often successful, is quinia, even when there is no ground to suspect a malarial agency. In order to secure the full effect of this drug, it should be given in doses to produce slight cinchonism, and be continued for a couple of weeks. After this period, if a curative effect be not produced, it may be abandoned. If quinia be not tolerated in full doses, salicin may be substituted in doses of a scruple or half a drachm three times daily. Arsenic is sometimes efficacious. It should be given in moderate doses, *e. g.*, four or five minims of Fowler's solution three times daily, and continued for several weeks without any increase in dose. Other remedies which have proved curative, but to the merits of which the author cannot bear testimony based on sufficient experience, are the oxide of zinc, the oxide of manganese, the subcarbonate of iron, and the iodide of potassium. Drs. Beard and Rockwell have reported a case in which notable relief was afforded by a strong galvanic current, the positive pole applied to the back of the neck and the negative pole over the region of the stomach.[1] With regard to this remedy, Leube says as follows: "I believe that drugs should not be resorted to until after a thorough trial of electricity, the one remedy for neuralgia which nowadays casts all others into the background. I have seen very good results from the use of the constant current, from ten to fifty elements, according to the sensitiveness of the patient." It should be added that, in the case reported by Drs. Beard and Rockwell, the faradaic current was found to be of no benefit.

---

[1] Medical and Surgical Electricity, 1875, page 484.

ENTERALGIA. GASTRO-ENTERALGIA.

Pain referable to the abdomen denotes neuralgia when not dependent on either inflammation, strangulation of intestine, or any structural affection, and excluding intestinal and nephritic colic. It denotes enteralgia, if, in addition to the foregoing affections, lumbo-abdominal neuralgia and myalgia (muscular rheumatism) be excluded. The diagnosis is thus reached by exclusion. The difference in the localization of the pain distinguishes enteralgia from gastralgia. The pain, however, in some cases extends over the epigastrium as well as over the remainder of the abdomen, and the affection is then gastro-enteralgia. The abdominal pain caused by lead-poisoning is neuralgic, although the term colic is applied to it. It is, therefore, embraced under the name enteralgia, but, with reference to diagnosis and treatment, it claims separate consideration.

Enteralgia and gastro-enteralgia, like gastralgia, may be either acute or chronic. The distinctive characters of these two forms are essentially the same as in gastralgia. Enteralgia is less frequent than gastralgia; it occurs oftener in women than in men; it may be associated with hysterical manifestations. The volume of the abdomen may not be increased, but the affection is sometimes accompanied by notable tympanites. Enteric and peritoneal inflammation, colonitis or dysentery, strangulation of intestine, typhlitis, perityphlitis, and perinephritis are excluded by absence of tenderness on pressure, and of other local symptoms distinctive of these affections. Moreover, the general symptoms which accompany them are wanting. Lumbo-abdominal neuralgia is unilateral, and tenderness on pressure by the side of the spinous processes of the vertebræ, and at other isolated points, is a diagnostic feature which is absent in enteralgia. Myalgia is characterized by tenderness over the affected muscles. Hyperæsthesia of the integument (dermalgia) may be accompanied by pain, and may simulate enteralgia as well as peritonitis. The tenderness in this affection is superficial; slight pressure with the ends of the fingers and percussion are painful, whereas, deep pressure with the open palm is well borne. The superficial tenderness, moreover, is rarely limited to the abdomen, but extends to the integument of the chest. The pain in metritis and uterine neuralgia (hysteralgia) is limited to the hypogastrium, and these affections can hardly be confounded with enteralgia.

Renal colic, that is, the pain caused by the passage of a calculus from the kidney to the bladder, an affection which will be considered among the diseases of the urinary system, might be confounded with enteralgia, if the diagnostic symptoms of the former were not borne in mind. These symptoms are the sudden occurrence of the pain, without any apparent causation; the localization of the pain on one side, at first in the lumbar region and extending downward in the direction of the ureter; the retraction frequently of the testicle; the frequent desire to urinate, with a scanty discharge of urine—the urine containing blood in some cases;

the occurrence of nausea or vomiting often, and the sudden cessation of pain, followed by a copious discharge of urine. Renal colic is to be excluded by the absence of these diagnostic symptoms. Enteralgia and intestinal colic are by some writers considered as one disease. The latter, however, is distinguished, clinically, by the character of the pain, which is significant of spasm, and by its occurrence in well-marked paroxysms. It is excluded by the absence of these distinctive features.

Treatment of Enteralgia and Gastro-enteralgia.

The indications for treatment are essentially the same as in cases of gastralgia (*vide* page 332). In the acute form, the pain is to be relieved by opiates in conjunction with accessory measures. In the chronic form, the same curative remedies are to be employed, together with treatment having reference to palliation and causal indications.

ENTERALGIA FROM LEAD. LEAD COLIC.

The local symptoms of saturnine or lead colic, known in past medical literature as Colica Pictonum and by various other names, do not differ materially from those which pertain to cases of enteralgia differing in respect of causation. The pain is continuous, but increased in exacerbations which recur irregularly, varying in intensity, and sometimes extremely intense. Generally the situation of the pain is around the umbilicus, but it may extend to the epigastric region (gastro-enteralgia), to the hypogastrium, and it is sometimes chiefly referred to the latter situations. The pain may also extend to the back, and to the lower limbs. The abdominal muscles are in some cases rigid, and the abdomen retracted. Absence of tenderness on pressure is the rule, but exceptions are not rare. If there be not hyperæsthesia of the integument or muscles, pressure over the abdomen affords some relief. The bowels are constipated. The appetite is diminished or lost. Nausea and vomiting are not uncommon. The quantity of urine is lessened. The frequency of the heart's action is often less than in health. In most instances the enteralgia is preceded by symptoms denoting gastric disorder, namely, impaired appetite, nausea, vomiting, together with a coated tongue, a metallic taste and fetor of the breath. The duration of the affection varies from a few days to several weeks.

The diagnosis of enteralgia is reached by exclusion as already stated (*vide* page 334). The next point is to determine that the enteralgia is due to lead, in other words, that the affection is lead colic. The relative proportion of the cases of neuralgia which are attributable to lead, is so large that this causation should always be suspected. The determination of the point involves the coexistence of other saturnine symptoms or affections and the known exposure to lead poisoning.

Paralysis of the extensor muscles of the hands and feet is pathognomonic of lead poisoning. If this precede or accompany the enteralgia, the saturnine causation of the latter is vastly probable. Other and rare effects are, intrinsically, less distinctive of the agency of lead, or saturnism, but they are to be taken into account in this causal diagnosis. These ects are delirium, coma, and convulsions, not otherwise explicable; uralgia in other situations; anæsthesia limited to a portion of the trunk r limbs; ptosis, strabismus, dilatation of the pupil, and finally anæmia which, together with emaciation, disordered digestion, infrequency of the pulse and muscular debility, denote a saturnine cachexia.

An effect which is especially valuable as a diagnostic criterion, is the coloration of the gums by the sulphuret of lead, forming what is known as the blue line. Fortunately for the diagnosis, this sign is available in a large proportion of cases. It is especially manifest on the gums corresponding to the lower incisors. An examination for this sign should never be omitted in cases of enteralgia.

Known exposure to poisoning by lead is, of course, a fact strongly corroborative of the diagnosis. Workers whose occupation brings them in constant contact with the metal, namely, miners, tinners, printers, etc., and those employed in either the manufacture of the different preparations of lead, or in their use, form a large proportion of the patients affected with this variety of enteralgia. Knowledge of the exposure should at once suggest the nature of the affection. But poisoning by lead often occurs when the mode of its introduction into the system is not apparent, and sometimes discovered with much difficulty. To ascertain the exposure is important, with reference not only to the diagnosis, but to the removal of the cause of the affection. For both these ends all probable or possible sources of poisoning should be investigated whenever there is reason to suspect this causation. Lead may be introduced int the system in a great variety of ways. Among these are, wine or cide to which the acetate of lead has been added; articles of food kept cooked in vessels lined with preparations containing lead; water, bee soda-water, etc., conducted in leaden pipes; cosmetics, hair dyes, vagi injections, collyria, etc.

The presence of lead in the urine in doubtful cases may establish diagnosis. In a case of lead poisoning from the use of a popular cosm called "the bloom of youth," Prof. R. O. Doremus obtained the me a metallic form from the urine of the patient. This diagnostic pro appeared in a case, under the author's observation, of paralysis in it was a question whether it was attributable to lead. As in wo examinations of the urine, testing for lead is not generally inclu methods employed by Prof. Doremus, which he has kindly cont are here introduced in his own language.

To Detect Lead in Urine.

Add a few grains of nitrate of soda or nitrate of potash to and evaporate to dryness in a small porcelain dish.

Moisten the residue with fuming nitric acid, and apply hea the organic matter, and convert any lead that may be pre nitrate of this metal.

Add distilled water, slightly acidulated with nitric acid; p a filter; bubble washed sulphuretted hydrogen through th hour.

If any traces of lead exist in the liquid, a black, or brow cipitate of the sulphide of lead will be formed. This should be filtered (a small filter is preferred) and washed with distilled water. The filter with its deposit should be dried. Remove a portion of the black sulphide; mix it intimately with a small quantity of charcoal and carbonate of soda; apply heat, and metallic lead will thus be reduced. A portion of the lead may oxidize, and form the yellow oxide of lead. Place the remainder of the filter and residue of the black sulphide (or the whole quantity) in a porcelain dish, heat it with a few drops of fuming nitric acid, and add a small quantity of distilled water.

Put a few drops of this solution on a watch-glass and evaporate slowly. Prismatic crystals of nitrate of lead will be formed. Pour a few drops of the liquid on a small porcelain dish, or in a test-tube, and add a trivial quantity of a solution of the iodide of potassium. The *yellow* iodide of lead will be produced.

On another dish place some of the suspected liquid and apply a few drops of a solution of the chromate of potash. The *yellow* chromate of lead will be seen. A small quantity of sulphuric acid (diluted) used in a similar way will yield the *white* sulphate of lead.

Treatment of Lead Colic.

The treatment of this variety of enteralgia embraces, *first*, the discovery, if possible, of the source of the lead poisoning, and the prevention of the further continuance of the cause of the affection. *Second*, opiates, sinapisms, and soothing applications to relieve pain, as in cases of enteralgia not due to lead. Electricity is stated to afford relief of severe exacerbations of pain.[1] *Third*, cathartics and large enemas to remove constipation. According to the author's experience, the drastic purgatives, which have long been considered important, are not called for. The removal of constipation may be effected by mild means, and this is all that is required. The Epsom salts form an eligible cathartic. *Fourth*, the iodide of potassium with a view to the elimination of lead from the body. This remedy is supposed to detach the metal from the albuminates fixed in the tissues, and to form a soluble combination which is excreted by the kidneys. The remedy should be given in large doses if well tolerated. It may sometimes be given in drachm doses three or four times daily. Sulphuric acid is useful as a preventive against the introduction of lead into the system, but has no efficacy in procuring its expulsion therefrom. Alum is apparently useful, but it is not an eliminating remedy. Sulphur baths remove lead which may have collected upon the surface of the body, but it can have no effect in the way of elimination. *Fifth*, chalybeates, with reference to the anæmia, together with tonic remedies, strychnia or nux vomica, quinia, etc., to promote the recovery of appetite and digestion.

Clinical observation shows that some persons are much more susceptible to lead poisoning than others. They who are especially susceptible should avoid occupations which involve exposure. The introduction into the system may be limited by free ventilation if the exposure be by inhalation within doors; by frequent ablutions if the lead enter through the skin, changing clothing which becomes saturated with preparations of lead, and by the use of masks or moist sponges, if free ventilation be not sufficient to free the atmosphere from dust or vapor containing this metal.

---

[1] Jaccoud, Pathologie Interne, 1877, tome second, page 986.

INTESTINAL COLIC.

Intestinal colic is distinguished from enteralgia by the spasmodic character of the pain, and a connection generally with indigestion. There are but few persons who have not had personal experience of a crapulous colic. The affection is characterized by pain, of which the term griping is descriptive. A vulgar name is "the gripes." The pain occurs in paroxysms of a few moments' duration. In a severe paroxysm the pain is intolerable. The body is bent forward, and, in a recumbent position, the knees are flexed. The patient groans or cries aloud from the suffering. In standing, the abdomen is compressed with the hands. The surface is often bathed in perspiration, and cool or cold to the touch. There is no fever. The abdominal muscles are sometimes spasmodically contracted. Borborygmal sounds are often heard. The paroxysms recur after short intervals. Flatus may be expelled from the bowels, and, after a time, copious, feculent, and liquid dejections take place. In the intervals the patient is comparatively or entirely free from suffering. The paroxysms cease after the occurrence of the dejections.

Colic pains occur in cases of peritonitis, enteritis, dysentery, and intestinal obstruction with strangulation. These affections are excluded by the absence of fever and abdominal tenderness, together with other symptoms which are diagnostic of each. The pains are rarely, if ever, as intense in these affections as in cases of severe functional colic, and the patient is not as free from suffering in the intervals. Dysentery is easily excluded by the absence of the dysenteric dejections. There is danger, without due attention, of confounding the other affections just named with functional colic of comparatively moderate severity.

In infants the localization of the paroxysmal pain in the abdomen is made by the writhing movements of the body and the flexion of the limbs; and the same affections are to be excluded as when the disease occurs at other periods of life.

Treatment of Intestinal Colic.

Although the affection is usually caused by the presence of irritating intestinal contents, purgatives should not be employed prior to the arrest of the paroxysms of pain. The latter is the primary object of treatment. Opiates are to be given until the paroxysms cease. The selection of the opiate and the mode of administration should have reference to a speedy effect. A salt of morphia, or laudanum, the dose determined by the degree of pain, may be given either by the mouth or rectum. With a view to a still more prompt effect, the former may be given hypodermically, with proper care as regards the dose, in order to avoid any risk of narcotism. If relief be not procured, the opiate may be repeated after from half an hour to an hour. Sinapisms and warm fomentations applied to the abdomen contribute to relief. In mild cases, the latter, with a carminative stimulant, *e. g.*, the syrup of ginger, spirit and hot water, or a drachm or two of paregoric elixir, will suffice. After twenty-four hours, if sufficient dejections do not occur spontaneously, a mild purgative may be given. It is often not required. By pursuing this method of treatment, in addition to its being best suited to cases of functional colic, the injury of cathartics is avoided, should the colic pains prove to be symptomatic of peritonitis, or intestinal obstruction with strangulation.

FUNCTIONAL DISORDERS OF DIGESTION. DYSPEPSIA AND INDIGESTION.

Certain disorders of digestion being unattended by symptoms denoting either inflammation or structural lesions, are to be considered as functional. Functional disorders are either acute or chronic. Another division is into difficult or labored and imperfect digestion. The former is expressed by the term dyspepsia, using this term in its literal, etymological sense; the latter may be distinguished as indigestion. Still another division is into disorders of gastric and intestinal digestion.

Acute Disorders of Digestion.

From over-repletion of the stomach, or in consequence of an arrest of the digestive processes, after the ingestion of food, by various causes, such as mental emotions, exposure to cold, and prolonged muscular exertions, disorders may arise sufficiently intense to be called acute. The prominent symptoms are as follows: A distressing sense of fulness or weight in the region of the stomach; eructations which are sometimes intensely acid and sometimes suggestive of putrefaction; cardialgia or heart-burn; embarrassed respiration from the pressure of the stomach distended with gas upon the diaphragm; excited and frequently irregular action of the heart; nausea and headache. These symptoms, more or less marked, are accompanied by a sense of debility or prostration and mental depression. Vomiting may occur, and the stomach is relieved of its undigested contents. This is followed by relief of the foregoing symptoms; but for several days the appetite is impaired, the digestive function is weakened, the tongue becomes coated, the patient complains of a bitter taste, the breath is offensive, and general debility, with mental depression, continues. If the contents of the stomach be not expelled by vomiting, they pass into the intestinal canal, giving rise to abdominal distress below the stomach, tympanitic distension, and not infrequently colic pains followed by diarrhœa. In some cases the disorders commence with, and are limited to, intestinal digestion. The symptoms of subacute gastritis, gastro-enteritis, or enteritis, namely, tenderness on pressure, some increase of temperature, and vomiting of mucus, may be developed, but they are secondary to the functional disorders. Sallowness of the complexion is a frequent symptom; the urine may contain bile, and sometimes there is distinct yellowness of the conjunctiva and skin. The urine generally deposits the urates in more or less abundance. An herpetic eruption on the face is not uncommon.

Infants and children are more prone than adults to acute disorders of digestion. They occasion in the former more constitutional disturbance and fever. In adults they constitute what is called acute dyspepsia, a fit of indigestion or a bilious attack.

The diagnosis involves either the exclusion of inflammation, or the occurrence of the latter as a secondary condition.

Treatment of Acute Disorders of Digestion.

A rational object of treatment is the removal of the undigested, irritating contents of the stomach or intestines by an emetic or a purgative. This object is often accomplished by the spontaneous occurrence of vomiting and purging. If these do not occur spontaneously, either a mild emetic or a cathartic is indicated, accordingly as the symptoms denote the presence of undigested aliment in the stomach or the intestine. The emetic to be preferred is ipecacuanha. If the use of the stomach-pump, as recommended by Leube, become popularized, so as not to excite apprehension in the mind of the patient, it is probably to be preferred to an emetic. In adults the contents of the stomach may be removed in this way more promptly and with less perturbation than by the operation of an emetic. In children the latter is preferable. As a purgative, calomel and jalap, with the addition of aromatic powder, or a few grains of the blue mass, followed by a saline, may be employed. After the removal of the irritating contents of the alimentary canal, comparative rest of the digestive organs is to be secured by a light diet for several days. The return to a full diet should be gradual, and a tonic remedy is beneficial. The latter may be quinia in small doses, strychnia, nux vomica, some one of the mineral acids, or a bitter vegetable infusion. A few grains of pepsin directly after taking food are useful. Restriction of the diet should not be too long continued. The usual dietetic habits, provided they do not involve the over-ingestion of food, may be resumed as soon as the digestive powers are not thereby overtaxed.

These acute disorders are exaggerations of those analogous in character which occur in the experience of most persons, and which are often not regarded as of sufficient importance to be brought to the notice of physicians.

CHRONIC DISORDERS OF DIGESTION.

Chronic functional disorders constitute either dyspepsia or indigestion, using these terms as they have been defined (*vide* page 339). Each may relate to digestion in the stomach, in the intestines, or in both these sections of the alimentary canal.

CHRONIC DYSPEPSIA.

In a case of pure dyspepsia, digestion takes place without evidence of incompleteness, that is, of indigestion, but it is accompanied by uncomfortable or distressing sensations. While the digestive processes are going on, there is a sense of oppression, together with various uncomfortable sensations referred to the abdomen; the exercise of the mental faculties is impeded; a disinclination to physical exertions is felt; the spirits are depressed; the mind is inclined to gloomy forebodings, and, in some cases, the condition is one of intense wretchedness. The daily experience of a confirmed dyspeptic is quite the reverse of that to which Shakespeare refers in saying, "let digestion wait on appetite and health on both."

Exclusive of the abnormal sensations referable to the digestive organs and the nervous system, including the mind, the functions of the body may be well performed. The appetite may not be impaired; indeed, patients are sometimes tormented by a craving for food which they dare not take lest it do them harm. The bowels are often, but not always, constipated. The nutrition of the body and the muscular power may be well maintained.

The diagnosis of dyspepsia in the restricted sense of the term as here used, involves the exclusion of symptoms which denote incomplete digestion or indigestion. The disorders embraced by the latter term will be presently considered. Dyspepsia may be referred to either gastric or intestinal digestion, or to both. If gastric, the symptoms follow speedily the ingestion of food; if intestinal, from two to three hours elapse before the symptoms are manifest; and if the dyspepsia be both gastric and intestinal, the symptoms are present during the digestive processes which take place in both sections of the alimentary canal.

Treatment of Dyspepsia.

Facts relating to the causation of labored or difficult digestion have an important bearing on the rationale of the treatment. The so-called working classes are very rarely affected with dyspepsia. The affection prevails chiefly among students, clerks, teachers, professional men, and those who do not pursue any avocation. They who devote careful attention to diet are especially apt to become dyspeptics. The attempt to live according to dietetic rules based on experimental observations and theoretical views, is almost sure to lead to the affection; in other words, it is produced and kept up by substituting for instinct, reason and personal experience, both of which are often fallacious as regards their practical application. In this point of view the causation is mental. It is a significant fact that they who are devoted to the pleasures of the table and habitually tax to the utmost the digestive powers, are rarely dyspeptics. Dyspepsia prevails among those who are abstemious, and who are constantly apprehensive of committing imprudences in diet—the antipodes of gourmands.

The measures of treatment relate to the mind and to diet. Recovery cannot take place if the diet be restricted below the alimentary requirements of health. The author has met with many instances of patients suffering from symptoms fairly attributable to innutrition, the restriction of diet being voluntary, and adopted, in opposition to appetite, with a view to health. The diet must be varied, as well as sufficient in quantity. Dyspepsia is sometimes attributable, in not a small degree, to a diet consisting of a few articles and without any change day after day. A patient cannot be expected to recover health whose diet consists of articles not acceptable to the palate, but selected because they are theoretically regarded as best suited to digestion. In short it is a *sine qua non*, in order for the treatment to be successful, that the diet be in accordance with the dictates of appetite and taste. The instructions to the patient should be to eat, of wholesome articles of food, whatever is most desired, and in quantity to satisfy the appetite, without regard to any system founded on particular notions respecting the digestibility of different kinds of food, individual idiosyncrasies, or personal experience. This will seem to the patient strange advice, and will perhaps be received with distrust. The treatment, however, should be followed sufficiently to give it a fair trial, and, if it prove unsuccessful, the patient must accept the situation of a permanent dyspeptic. Inasmuch as the method is at variance with the practice of many, if not most, physicians, and is opposed to popular ideas, it is proper to add that the author derives his confidence in its success from a pretty large experience.[1]

A mental reform is essential to the success of the dietetic treatment. Gratuitous apprehensions concerning diet are to be overcome, and confidence in the digestive powers is to be acquired. The processes of digestion must not be watched. After the ingestion of food, the mind must be diverted. Any one whose attention is occupied with the sensations which follow every meal, and undertakes to be governed thereby, will become a dyspeptic, or, if one already, will never be cured. Solitary meals are to be avoided, and cheerful occupation which prevents introversion of the mind, is vastly more important than drugs.

Medicinal remedies are not without utility. Mild tonic remedies are useful, but their usefulness is partly, if not chiefly, due to a moral effect. Out-of-door life, rural sports, travelling, and recreations are sometimes wonderfully beneficial, partly by increasing the activity of the processes of nutrition, but more especially by causing a diversion of the attention from the processes of digestion. Anæmia and habitual constipation, which are often associated with dyspepsia, claim appropriate treatment. The uncomfortable sensations after eating, in some cases of dyspepsia, are relieved by alcoholics. These should, however, never be recommended for that object, owing to the liability to become addicted to their use beyond sanitary limits.

Chronic Indigestion.

The symptoms denoting imperfect digestion or indigestion are regurgitations and vomiting, cardialgia, tympanites, and diarrhœa. Certain cases are characterized by the prominence of either of these symptoms, or they may severally be more or less prominent, at different times, in the same case. Dyspepsia and indigestion are often combined, but the latter does not always imply the former; the characteristics of each may be present without those of the other. Indigestion, as well as dyspepsia, may be limited to the stomach or to the intestines, or it may be manifested in both.

Regurgitations and Vomiting.—Vomiting is an infrequent symptom, exclusive of certain cases in which it is the chief manifestation of disordered function. In these cases, owing to its prominence, it will be considered presently as a distinct variety of functional disorder.

---

[1] *Vide* "Food in its Relation to Personal and Public Health," "Public Health Papers of the American Public Health Association," vol. iii. 1877.

Regurgitations, together with eructations, during gastric digestion, are not very uncommon. The regurgitated matters are sometimes intensely acid, and sometimes acrid causing in the throat a scalding sensation. If they occur shortly after taking food, the properties of the latter, as regards taste, may be recognized. When they are characterized by acidity, alkalies, *e. g.*, the bicarbonate of soda or lime-water, afford relief. In all cases, full doses of bismuth often prove effectual as a palliative remedy. Removing the contents by means of the stomach-pump, and washing out the stomach, is, of course, effectual, and may be resorted to if the annoyance be sufficient to warrant this measure.

CARDIALGIA.—This, commonly known as heart-burn, is a frequent symptom of indigestion, and is a source sometimes of much discomfort. It is promptly relieved by an alkali.

TYMPANITES.—Tympanites may be gastric or intestinal. The sensations of the patient, and the efforts to expel gas either from the stomach or the rectum, point to its situation; but the latter may be determined more demonstratively by percussion. The presence of gas in either the stomach or the intestines, or in both, is shown by tympanitic resonance. If in both situations, the relative space occupied by the gastric and intestinal tympanites is ascertained by attention to the difference in pitch of the resonance. By differences in pitch, the resonance is easily referred to the stomach, small intestine, cæcum, or colon.

It is a question whether tympanites is in all cases a symptom of indigestion. In the great majority of instances, undoubtedly, the production of gas is due to fermentative changes which are not controlled by the digestive processes. It is difficult thus to explain the enormous tympanites, in some cases, when it is neither preceded nor accompanied by other evidence of indigestion, and occurring suddenly and perhaps disappearing as suddenly, either with or without the expulsion of flatus, which may be inodorous, and associated sometimes with hysterical manifestations. Cases presenting the diagnostic characters just stated have fallen under the author's observation, the patients being women.[1] The following illustrative case came under observation in 1874: The patient, a girl about 14 years of age, had had diphtheria a year previously, which was followed by nervous aphonia and some difficulty in deglutition. These sequels had disappeared. For several months she had been subject to sudden intestinal tympanites, accompanied by loud borborygmal sounds heard at a distance. The attacks were always in the daytime, and were of variable duration. They passed off without any expulsion of flatus. There were no hysterical symptoms apparent in this case. The attacks had no uniform relation to the time of taking food. Menstruation was regular. She was subject to epistaxis. Anæmia was denoted by a loud venous hum in the neck, together with the usual symptoms, namely, coldness of extremities, pain in the left side, want of endurance, lack of buoyancy, etc. She recovered under treatment addressed to the anæmic condition.

---

[1] *Vide* Principles and Practice of Medicine, 4th edition, page 434.

Gastric tympanites may be caused by swallowing air. This cause is much more infrequent than some writers suppose. The process of swallowing air, after the manner of "crib biting," is extremely difficult. The author has reported a striking instance, and the only one which he has observed. But, as this is a habit which can be regulated by the will, a patient would hardly carry it far enough to produce painful distension of the stomach.

Tympanites, gastric or intestinal, as incidental to indigestion, is a source of discomfort or distress from the sense of distension, the effect upon the diaphragmatic movements, and frequently disturbed action of the heart. Palliative remedies are those which promote the expulsion of gas, and those which arrest fermentative changes. The former remedies are the various carminatives, such as anise, calamus, cinnamon, cardamom, peppermint, ginger, etc. The pulvis aromaticus is an eligible preparation. The spirit of turpentine is sometimes efficient when remedies less disagreeable prove inefficacious. Intestinal tympanites is relieved by injections containing turpentine. Abdominal frictions are useful. Drs. Beard and Rockwell state that it readily yields to electrical treatment. In cases of excessive gastric tympanites, it would be proper to remove the gas by the introduction of the stomach-tube. To prevent the continued evolution of gas, the bisulphite of soda, sulphurous acid, creosote, the carbolic acid, and salicin may be prescribed. The latter is especially useful in doses of ten grains preceding or following each meal. Pulverized charcoal is of some utility by absorbing gas within the stomach.

DIARRHŒA.—Looseness of the bowels, or diarrhœa, has somewhat the same relation to intestinal, as regurgitations have to gastric, indigestion. Diarrhœa will presently be considered as one of the functional affections of the digestive system. It is dependent on intestinal indigestion in a large proportion of cases—a fact of importance with reference to the treatment. Occurring in this pathological connection, the dejections are feculent and lienteric.

Treatment of Indigestion.

The palliative treatment of regurgitations, cardialgia, and tympanites has been considered. To secure complete digestion, is the object of curative treatment in all cases of either gastric or intestinal indigestion. This object is to be effected by diet, medicinal remedies, and hygienic measures.

The dietetic treatment sometimes involves temporary restrictions as regards alimentation. Indigestion may proceed from excesses and other errors in diet. If the digestive powers have been overtaxed, restrictions in respect of quantity and the articles of food are indicated. In cases of gastric indigestion, a diet consisting chiefly of milk and farinaceous food is advisible. If, on the other hand, the indigestion be intestinal, animal food should form the larger proportion of the diet. The quantity of food, modes of its preparation, and the intervals between the times of taking it, are to be adjusted to the diminished capacity for digestion. In these regards the diet is to be regulated according to peculiarities and experience in individual cases. These dietetic regulations are for the purpose of giving overworked organs a period of comparative rest. Restrictions in diet, however, are not to be carried too far, nor continued too long. The liability to err in these directions is greater than in the way of insufficient restrictions; and it is better not to restrict at all than to restrict unduly. Recovery cannot take place until restrictions become unnecessary. A patient who undertakes to follow a carefully regulated diet for the remainder of life, can never attain to full health and vigor. This is not saying that a carefully regulated diet during life is never advisible. The cases, however, in which it is judicious, are less numerous than is commonly supposed. In general, it is desirable that the diet, without much delay, be brought up to the full requirements of health. This statement is alike applicable whether the disordered digestion is, or is not, attributable to over-tasking the digestive powers. It is perhaps true that chronic indigestion is oftener caused by errors of diet, the reverse of over-indulgence; namely, living on poor or badly cooked food, either from necessity, indifference, or erroneous ideas as to the preservation of health; irregularity in meals, eating too hastily, the abuse of spirits, etc. The views stated in respect to mental influences in dyspepsia, will also apply to indigestion.

Remedies constituting the medicinal treatment are those which, either directly or indirectly, increase the functional capacity of the organs of digestion, and those which promote the digestive processes while they are in progress.

The remedies acting directly upon the digestive organs are quinia, salicin, strychnia, nux vomica, and the various vegetable bitter infusions or tinctures classed in the materia medica as tonics. Of these remedies, selections are to be made, and varied from time to time, according to the judgment of the practitioner. The same remedy is not equally useful in all cases, and, therefore, a trial of different remedies in the same case is advisable.

The functional activity of the digestive organs is increased indirectly by remedies which remove associated morbid conditions standing in a causative relation to indigestion. This is true particularly of anæmia, and patients suffering from chronic indigestion are often anæmic. It follows that the chalybeate tonics are useful in many cases.

Medicines which promote the digestive processes while they are in progress, are to be taken shortly after the ingestion of food. Pepsin, hydrochloric acid, lactic acid, and alcoholics are remedies which may be usefully employed for this purpose. Five or ten grains of pure pepsin directly after each meal. Six or eight minims of hydrochloric acid may be given half an hour after eating. This dose may be repeated four hours later. Lactic acid may be prescribed in the same way, or combined with pepsin, in doses of fifteen minims. Alcoholics in the form of wine or spirits, sometimes render more complete the processes of digestion. They should be given in moderate quantity, and at the time of taking food. As regards the choice of spirits or wine, and of the different kinds of each, the experience in individual cases is the best guide.

Proper discretion is to be used in advising or sanctioning the use of alcoholics, in view of the risk of their abuse.

Leube advocates the removal of some of the contents of the stomach during different stages of digestion, by means of a stomach pump, or a siphon tube, in order to study their odor and reactions with a view to therapeutical indications. Many patients would not submit to this procedure unless convinced of its being essential, and moreover, the results of the exploration on one day could not be taken as representing conditions on other days. From his researches made in this way, Leube was led to think that pepsin and hydrochloric acid are the remedies generally indicated.[1]

Hygienic treatment is especially important. Muscular exercise and life in the open air, by increasing nutrition, increase the functional activity of the digestive organs. These measures, however, should not be pushed to a degree causing undue fatigue or exhaustion. Patients are apt to fall into this error. The attention is to be directed as much as possible from the digestive organs by mental occupation and recreations. Travelling, and particularly sea-voyages, are often potential means of cure. The invigorating effect of the sponge bath is serviceable. To persons who are compelled to continue sedentary habits, the "health lift" may be recommended. The hardships of expeditions or excursions which involve for a time an exchange of comforts and luxuries for a savage life, sometimes have a wonderfully good effect upon the faculty of digestion.

Electricity is a useful agent in the treatment of some cases of dyspepsia and indigestion. The treatise by Drs. Beard and Rockwell contains some striking illustrations of success from general faradization.

ANOREXIA.

Loss of appetite, or anorexia, is a symptom in most acute local and general affections. It is also a symptom in chronic inflammatory and structural diseases of the stomach. It is a prominent feature of idiopathic or pernicious anæmia, leucocythemia, the so-called adenoid or Hodgkin's disease, cases of phthisis, Bright's disease, carcinoma in different situations, etc. It characterizes cases of fatal disease occurring in persons of middle or advanced life, the pathological character of which is not as yet fully established, but which is probably seated in the glands secreting the gastric and intestinal digestive fluids. Irrespective of all these pathological connections, it represents a functional disorder which, in the present state of our knowledge, is to be regarded as an individual affection.

Functional anorexia occurs chiefly in girls or young women. It is often connected with manifestations of hysteria. In a degree sufficient to occasion anæmia, muscular debility, and more or less emaciation, without being persistent or giving rise to alarming symptoms, it is not an uncommon affection. The anorexia is sometimes accompanied by a morbid craving for indigestible substances, such as slate, chalk, charcoal, etc. (malacia, pica). But in some cases, from the completeness and the continuance of the anorexia, the patient becomes greatly reduced as regards weight and strength. Under these circumstances the condition appears to be alarming. Naturally, some occult, grave affection is suspected. The malady is not without danger, death sometimes taking place from asthenia. The great majority of cases, however, recover.

---

[1] *Vide* "Ueber die Therapie der Magenkrankheiten," Sammlung Klinischen Vorträge, von Volkmann, Leipzig, 1873.

The anorexia is doubtless only a symptom, but the nature and seat of the affection cannot, with our present knowledge, be stated. That it is a neuropathic affection is shown by the frequent association of hysteria. From the period of life when it occurs, and its limitation mostly to young girls, its connection in some way with the evolution of the sexual system is probable. It is a well-known feature in some cases of insanity.

The diagnosis is to be made by the exclusion of the various affections already referred to, the existence of which would account for the anorexia. In order to exclude these affections, of course, all the organs of the body, together with the blood, are to be carefully explored. Amenorrhœa, which generally coexists, is to be regarded not as a cause, but an effect.

Treatment of Anorexia.

The various tonic remedies, such as quinia, nux vomica, the vegetable bitters, and mineral acids, are to be tried in succession. If the anorexia be complete, or nearly so, systematic efforts to administer food are necessary; and, if persuasion will not succeed, either compulsion must be resorted to, or liquid food be introduced by means of the stomach-tube. Rectal alimentation is a resource, if the foregoing means be not practicable. At the same time, measures of treatment addressed to the mind and nervous system are essential. These consist of life in the open air, change of scene, the sponge-bath or the wet pack, and the use of the bromides.

In a case illustrative of this affection which came under the author's observation some years since, the patient, a girl 12 or 14 years of age, was made to eat only by compulsion. She moaned constantly, and took but little notice of persons and things around her. She recovered perfectly after sojourning some weeks at the sea-coast, being bathed daily, and taking a certain quantity of food several times a day under the penalty of punishment if she refused.[1]

VOMITING.

Vomiting, like anorexia, from a clinical standpoint, under certain circumstances, may be considered as an individual affection. The circumstances in most cases are similar to those under which functional anorexia occurs, and the latter is usually conjoined. It is an affection almost peculiar to women; analogous cases in men being extremely rare. Girls near the age of puberty are affected much oftener than women after this period of life, but the latter are not exempt from it.

---

[1] *Vide* articles by Dr. Gull, on Anorexia nervosa, Apepsia hysterica, Anorexia hysterica, in London Lancet, August, 1868, and in Transactions of the Clinical Society of London, vol. vii., 1874. Dr. Gull refers to a paper by Dr. Laségue, of Paris. on Anorexia hysterica, in the Archives Générales de Médecine, April, 1873, translated into the pages of the London Med. Times in September, 1873.

The vomiting proceeds from an intolerance of food by the stomach. Aliment of all kinds is directly or quickly rejected, often without having undergone any change. It cannot be said that the vomiting is due to either dyspepsia or indigestion, for the ingesta do not remain in the stomach long enough for the commencement of the digestive process. The food, however, which may be retained is likely to occasion dyspeptic ailments, and to give rise to symptoms denoting incomplete digestion. But it is a remarkable fact that, while almost everything ingested appears to be vomited, during a considerable period, the muscular strength and weight are not always notably diminished.

In addition to the bearing of sex, age, and association with neuropathic or hysterical manifestations on the diagnosis, all the various affections of which vomiting is a symptom are to be excluded. The affection is apt to be confounded with gastric ulcer; but the latter is excluded by the absence of the characteristic pain and of hemorrhage. Moreover, the vomiting in cases of gastric ulcer does not follow so quickly after the ingestion of food, and certain kinds of food are often tolerated. The morbid condition represented by the functional vomiting doubtless pertains to the nervous system; it is a nervous affection, and, regarded from a pathological point of view, it might with propriety be included among the neuroses. In respect of its neuropathic character, it is analogous to the vomiting which frequently attends pregnancy.

Treatment of Vomiting.

The affection is often persistent, and, especially as regards medicinal treatment, intractable. The remedies which relieve vomiting in other connections, namely, bismuth, hydrocyanic acid, creosote, oxalate of cerium, etc., are rarely effective. They should, however, be fairly tried. Trial should be persistently made of different kinds of food prepared in different ways, with the hope of finding something which the stomach will tolerate. If any form of diet can be found which is not rejected, the stomach will soon retain other articles, and the disorder will be overcome. A method of treatment which sometimes succeeds is to give food in a very small quantity at a time, at intervals of a few moments. Milk, given in this way, is the form of nourishment most likely to be retained. It is sometimes tolerated best when iced, and sometimes when given as hot as can be borne. Skimmed milk and butter-milk may be borne when other forms are rejected. Raw meat and hard biscuit or crackers taken dry, are among the articles of diet which the stomach, in its apparent perverseness, does not reject. Any kind of food to which the patient may be inclined, should be allowed without regard to its digestibility, even supposing the desired article be linburger cheese or a Dutch salad!

If the efforts to overcome the intolerance of food by the stomach fail rectal alimentation may be resorted to. After a period of complete rest the stomach will be likely to tolerate nourishment. The requirements for nutrition can be fully met by nutritive injections. This method has proved successful in several cases which have come under the author's observation. From time to time, while the system is nourished by the rectum, experimental trials of the ingestion of food by the stomach should be made, and when the vomiting is found not to recur, alimentation by the rectum may be discontinued.

Hygienic treatment addressed to the mind and nervous system, is generally effectual. A sea-voyage, travelling, change of scene, new associations, and mental diversion are the measures of hygiene to be employed.

Drs. Beard and Rockwell have reported a case in which notable success was obtained by galvanization of the sympathetic and pneumogastric nerves followed by general faradization. The patient in this case had become greatly reduced in weight and strength, so that her life was despaired of. After two months of the electrical treatment she had regained her normal weight.

Although this affection not infrequently taxes the patience and ingenuity of the physician, sooner or later recovery takes place. The prognosis is always favorable. When the stomach resumes the exercise of its digestive functions, remedies to improve digestion, nerve tonics, and chalybeates are indicated.

DIARRHŒA.

Diarrhœa is to be regarded as a functional affection when inflammatory and structural diseases of the alimentary canal can be excluded, together with Bright's disease and cirrhosis of the liver. It is an occasional symptom of the two affections just named, due, in the former, to an elimination of urea by the intestinal mucous membrane, and, in the latter, to portal congestion from hepatic obstruction. In most of the cases in which it exists irrespective of the various diseases to be excluded in the diagnosis, it is caused by either irritating matters entering with the ingesta, or by chemical changes in the contents of the intestine, owing to defective intestinal digestion. The latter causation is to be considered in the treatment. It is not always easy to determine whether subacute inflammation exists or not. The affection may be primarily functional, and inflammation be produced secondarily by the local causes which occasion diarrhœa. The affection is much more frequent in infancy and childhood than afterward. It occurs oftener in the summer season than at other periods of the year, and is especially rife in tropical climates. These facts tend to corroborate the statement made concerning its etiology. The diarrhœal dejections have characters which vary in different cases, and at different times in the same case. They may be feculent, that is, feces liquefied by serous effusion, watery or lienteric. The appearance may show either deficiency or excess of bile coloration. In infants especially they are often green. Blood, unchanged in appearance, mucus, pus, and flocculi of fibrin are not present. Their presence should denote something more than a functional affection. The dejections are often preceded or accompanied by colic pains.

Treatment of Diarrhœa.

If irritating contents or fecal masses be inferred from the size and character of the stools, or ascertained by exploration of the abdomen, the bowels should be efficiently moved by a cathartic. A few grains of calomel and jalap combined with aromatic powder, and followed by a saline, or a full dose of castor oil, may be employed for this purpose. When the diarrhœa persists, the cathartic should, from time to time, be repeated.

The cathartic should be followed by astringent remedies which in many cases will arrest the diarrhœa. The remedies from which selections are to be made, or which are to be tried in succession, are, bismuth in full or large doses, *i. e.* from twenty to forty grains two or three times daily, combined with an aromatic powder, tannic acid, the acetate of lead and the chalk powder, the astringent preparations of iron, the nitrate of silver, and the vegetable astringents such as kino, catechu, etc. The latter are more agreeable and effective given in the chalk mixture. All these should be taken several times daily, so as to form the "continuous dose." Should the astringent remedies prove unsuccessful, opium is to be added in small doses. If not needed, this remedy is to be avoided, in consequence of its effect upon digestion, and the liability to form the "opium habit."

Remedies to improve both gastric and intestinal digestion are indicated, namely, quinia in tonic doses, strychnia or nux vomica, the hydrochloric acid, the bitter vegetable infusions or tinctures, and pepsin.

The dietetic treatment is of essential importance. It is meeting a rational indication to advise articles of food, nutritious and easily digestible, which are digested mainly in the stomach; but, as in other affections, the desires and the experience of the patient are to have a preponderating influence in the dietetic treatment. Meat broths and gruels will be found generally to be inappropriate. A diet consisting, for a limited period, of milk and bread or rice, is sometimes well adapted to this affection. Milk skimmed and scalded may be better digested than when pure and uncooked. Lime-water may be added with advantage. The diet should not be below the wants of the system.

In cases of obstinate diarrhœa, a change from a tropical climate or one which is humid and variable, to a cold, uniform, dry region, is the most effective measure of treatment. A sea-voyage of several weeks' duration is, also, a successful hygienic measure. The warmth and functional activity of the skin should be maintained by appropriate clothing.

The same general principles are applicable to the treatment of cases occurring in infancy and childhood, as in after life. As in other affections, infants and young children require especially care in the dietetic management. It is hazardous ever to rely on artificial preparations as a substitute for milk—that precious food in which the various alimentary principles are combined by the hand of Providence! Living in the open air as much as practicable, and removal from the city to the country, or from an insalubrious to a salubrious situation, are often successful without much medicinal treatment.

In cases of fatty diarrhœa (*vide* page 259), a cure has been effected by different methods of treatment, namely, olive oil given largely, several ounces of whiskey taken daily, and change from an indoor occupation to a life of activity out of doors. Dr. Langdon Down has reported a case of rapid recovery, the patient having remained free from the malady for several months, under the use of pancreatic extract.[1]

---

[1] *Vide* Trans. Clinical Society of London, vol. ii. 1869.

HABITUAL CONSTIPATION. OBSTIPATION.

Constipation (coprostasis) and costiveness, that is, the dejections being either too infrequent or insufficient, is a very common disorder, and occasions often much annoyance. The diagnosis, it is obvious, is attended with no difficulty. The intervals between the dejections may be several days or weeks, if not produced by remedial measures (constipation); or they may take place daily, but the quantity is small and the expulsion often difficult (costiveness). In order to ascertain the condition of the large intestine as regards the quantity of fecal contents, in addition to obtaining information concerning the number and size of the dejections, the abdomen should be examined by palpation. By this means often an accumulatiom of feces in the colon is determinable. An exploration of the rectum by the finger or a bougie is useful in order to determine whether, or not, there is an accumulation in this situation. Daily dejections may take place although much fecal matter is retained. The author has met with instances in which there were immense accumulations within the rectum, and in other portions of the large intestine, notwithstanding that the bowels were reported as sufficiently open. Indeed, there may be looseness of the bowels and, without examination, remedies to relieve diarrhœa appear to be indicated, when the patient is actually suffering from retention.

Transient constipation or costiveness is incidental to many diseases, and claims treatment by cathartics, or laxatives, according to circumstances in individual cases. Undue retention of feces is, also, a temporary disorder, attributable to various causes, without the existence of any other affection. Relief is obtained by appropriate evacuants given by the mouth or by enemas. In proceeding to consider the treatment of constipation, reference is had to cases in which the functional disorder is persistent or habitual. To treat these cases successfully is not always easy.

The pathological conditions of the large intestine to be overcome by treatment, are to be considered. There are two important factors involved in habitual constipation, namely, 1st, deficient muscular power to propel and expel the intestinal contents, due to over-accumulation, in other words, paralysis from distension; and 2d, impairment or loss of the peculiar sense of the presence of feces within the rectum. The objects of treatment are to render the muscular coat competent to fulfil its function, and to restore the normal sensibility to the lower portion of the intestine. The conditions are analogous to those in cases of a permanently distended bladder from an enlarged prostate or other causes; and the objects of the treatment are similar.

Treatment of Constipation.

Fecal accumulations in any part of the large intestine are to be effectually removed. If they be situated in the cæcum, ascending or transverse colon, cathartics should be given and repeated until the end is attained. Castor oil and the salines, especially the Epsom salts, are well adapted to this end. If situated in the descending colon, large enemas are effective.

From the rectum an accumulation may be removed by mechanical means; the handle of a spoon answers for this purpose. These measures are to be repeated if reaccumulations take place. After their effectual removal, the treatment has reference to the prevention of an undue retention of the feces. If this be successful, the intestine may be expected to regain its normal muscular power and sensibility. The measures of treatment are dietetic, medicinal, and mechanical.

Certain articles of food which either increase the peristaltic movements, or in some way have a laxative effect, constitute the dietetic treatment. The use daily of corn-meal, wheaten grits, oat meal, unbolted flour, various fresh or preserved fruits and vegetables, suffices, in many cases, to keep the bowels open. In choosing among these articles, individual experience, in each case, is to be the guide. Dietetic treatment is to be preferred, provided the articles of diet do not disturb digestion more than medicinal remedies, or take the place of other articles which are important for nutrition. Bartholow states that constipation, to a moderate extent, may be overcome by the daily use of a few almonds and raisins (about six of each) at dessert.

The medicinal remedies are various, and the adaptations to different cases are to be ascertained by experimental observations. The simplest remedies, if they suffice, are the best. They should prevent the retention of feces, without causing purgation. The latter is to be avoided after intestinal accumulations have been removed. The simplest remedy, which can hardly be called medicinal, is a tumblerful of pure water before breakfast. This sometimes suffices. If insufficient, a teaspoonful of table salt dissolved in the water, often renders it effective. If this fail, a half-drachm of Epsom or the Rochelle salts may be substituted. The so-called "bitter waters," namely, Friederickshall, Pullner, Hunyadi Janos, etc., taken in the morning, are well adapted to many cases. If the salines disturb the stomach, or it be found difficult to regulate their laxative effect, other remedies should be tried. A dinner pill, such as that known as the Lady Webster's, and the *grains de Santé*, are often eligible remedies. They should be taken at bedtime. The extract of butternut and the tincture of aloes and myrrh answer well. The confection of senna, and the Tamar Indien are laxative preparations which have the advantage of not being unpalatable. The extract of belladonna, from one-sixth to two-thirds of a grain taken before breakfast, is sometimes effectual, but by no means so generally as the teachings of Trousseau would lead one to suppose. Its effectiveness is increased by combination with nux vomica.

The mechanical means are injections and suppositories. A pint or more of cold water injected into the rectum, generally causes an expulsion of the fecal contents below the sigmoid flexure, and increases peristaltic movements above that point. For occasional, prompt relief, injections are far preferable to remedies taken per orem; but, repeated daily, they cease after a time to be effective, and they interfere with the recovery of the muscular power and sensibility of the rectum. Conical suppositories of soap or molasses candy introduced into the rectum, are popular means of procuring dejections in infants or children. They are sometimes resorted to by adults, but their efficiency is doubtful and limited. Magnesia and mustard seeds, which have heretofore been much employed in habitual constipation, are not to be recommended, for the reason that they are liable to form intestinal concretions.

Kneading the abdomen, directing the pressure from the cæcum in the direction of the colon, excites the peristaltic movements, and is of use in overcoming habitual constipation. The interrupted electrical current, in the practice of Drs. Beard and Rockwell, has been found successful in procuring immediate and sometimes permanent relief. These authors employ this agent by means of a rectal electrode, non-insulated or insulated up to a point near the tip, and either double or single, the other pole being applied at different points over the abdomen. They state that a very powerful current may be borne in the rectum without discomfort.

Prevention of Constipation.

With proper attention to the function of defecation, habitual constipation may be prevented. The preventive means are a full, varied diet, and a careful observance of the calls of nature. Disregard of the latter, and inadequate efforts to secure the complete performance of the function of defecation, account for the prevalence of this troublesome disorder. It is not desirable in health that the quantity of food should be accurately restricted to the requirements of nutrition, nor that food should be so purely nutritive as to leave little or no fecal residue. As regards the exercise of the function of defecation, the following rules are to be inculcated: Pains should be taken to secure at least one sufficient dejection daily. The formation of a habit of evacuating the bowels at a certain time every day is desirable. The desire for an evacuation is never to be disregarded, and, if practicable, it should be heeded without delay. Ample time should be given to the act of defecation. Generally, directly after the rectum has been emptied, the intestinal contents above are propelled downward. Time should be allowed for the latter to be evacuated; otherwise the rectum (which normally should be empty) is refilled shortly after the hasty act of defecation is finished. In order that the act shall not be too hastily concluded, the conveniences should be comfortable and the mind interested, so that the act may not be prematurely ended. It is a good plan for persons whose tastes or pursuits are intellectual, to provide some engaging mental occupation for the time devoted to diurnal attendance in the temple of Cloacina. The appropriation of half an hour daily for so important a duty as defecation, is a judicious investment of time. Constipation will be far less common than it now is, when the dignity, as well as the importance, of defecation is properly recognized, and the accommodations for paying proper respect to this function are less uncomfortable and repulsive than they often are at the present time. Never postpone the performance of the duty of defecation, and never hurry its performance, are maxims which, if duly heeded, would effectually prevent habitual constipation.

Obstipation.

This term may be applied to distinguish the retention of feces for a long period, namely, weeks and even months, without any mechanical obstruction. The retention is due to loss of the muscular power of the large intestine, which becomes lengthened and dilated in proportion to the fecal accumulation. The most remarkable of the cases of long-continued obstipation, with a single exception, was reported by Dr. Thomas D. Strong, of Westfield, N. Y., in 1874. In this case the patient was habitually constipated from childhood. When two years old, the intervals between the dejections averaged about two weeks. Several years later, the intervals had increased to six weeks. After about twenty years of age, he was under Dr. Strong's observation for six years. The intervals had now increased to months, and the longest period was eight months and sixteen days! The process of defecation lasted from two to four days, and occasioned much sickness and exhaustion. The matters evacuated had an appearance like brown paper chewed, "the paper-wads of schoolboy days." The amount of matter evacuated on one occasion, as determined by subtracting the weight after, from that before, the occurrence of the dejections, was forty pounds! The abdomen when loaded was hard; the diaphragm pressed high upward; and the immensely dilated colon was traceable, and felt like a huge sausage. The patient was a laborer, and was able to do light work on a farm. After death, which took place at the age of twenty-eight, the colon measured six feet and three inches in length, and thirteen inches in circumference. The lower part was much thickened.[1]

Effective measures to prevent the retention of feces, before complete paresis of the muscular coat of the large intestine results from the accumulation, are indicated in cases of obstipation. The medicinal treatment has been already stated (*vide* page 352). If this be not successful, the contents of the large intestine may be removed by the persistent employment of enemata given through a long flexible tube which may be introduced to the sigmoid flexure.

Functional Obstruction of the Bowels.

This heading is intended to embrace cases in which is simulated obstruction with symptoms of strangulation. Constipation exists, with abdominal pains and persistent vomiting. The matters vomited may have the odor of feces. That invagination, internal hernia, or analogous conditions are not present, is shown by the absence of the local and general symptoms of peritonitis. Moreover, after some delay and difficulty in procuring free intestinal dejections, recovery takes place. The diagnosis of a functional affection (idiopathic ileus) is to be based on the exclusion of peritonitis, either general or circumscribed, the non-occurrence of collapse, the absence of symptoms denoting a localized affection, and the favorable termination. So far as the author's acquaintance with these cases goes, the patients are women, and the affection is accompanied by hysteria or manifestations of neuropathic disturbance. The diagnostic points cannot be made out early, and it behooves the practitioner not to be hasty in concluding that he has to deal with a purely functional affection. Careful examinations should be made to discover hernia at the inguinal and femoral regions, and caution is to be exercised in deciding on the absence of the symptoms of strangulation.

---

[1] For further details of this remarkable case, *vide* American Journal of the Medical Sciences, No. for October, 1874, page 440, and No. for April, 1876, page 430. The editor cites analogous cases, in one of which the obstipation continued for nine months.

The treatment is fortunately the same as if obstruction with symptoms of strangulation existed. Cathartics are to be avoided. The pain and vomiting are to be relieved by opiates, together with soothing applications to the abdomen. Afterward, injections containing common salt, castor oil, or turpentine, given by means of a flexible tube carried up to the sigmoid flexure, constitute the most efficient measure of treatment. When abundant fecal dejections have been procured in this way, the obstruction of course is at an end, and the other symptoms disappear.

SPORADIC CHOLERA.

The term sporadic distinguishes this affection from epidemic cholera. The latter, known also as Asiatic cholera, cholera asphyxia, and various other names, belongs among the general diseases, and will be considered in that nosological division. Sporadic cholera is also called cholera morbus and cholera nostras. By German and some French authors (*e. g.* Jaccoud), it is considered as a variety of acute gastro-intestinal catarrh.

An attack of sporadic cholera is abrupt. Diarrhœa occurs with few or no colic pains, and vomiting is either coincident or it speedily follows. The dejections and the matters vomited are, at first, the fecal contents of the large intestine and ingesta. Following these a serous or watery liquid is expelled from the stomach and bowels, denoting transudation, gastric and intestinal (gastrorrhœa and enterorrhœa). Vomiting and purging, occurring simultaneously or alternately, are repeated after short intervals. The rapid withdrawal from the blood of a large quantity of liquid, causes weakness of the circulation and general prostration. Painful cramps of the muscles of the extremities are not uncommon. The body heat falls below the normal range. The lips and face sometimes present a cyanotic appearance.

Notwithstanding these symptoms, the affection, in the adult, is attended with little or no danger. If left to pursue its course, it ends after a few hours. It is rarely followed by fever. The digestive organs speedily resume their functions, and recovery is usually rapid.

The diagnosis is very seldom attended with any difficulty. In some cases the symptoms approximate to those which are characteristic of epidemic cholera. The latter disease may be excluded if it be not prevalent; it is only when epidemic cholera prevails that there is occasion for this differential diagnosis. Vomiting and purging may be produced by acrid or corrosive poisons. As thus produced, the vomiting precedes the purging; the matters vomited are mucous and often bloody, not serous, in character. Gastric pain is prominent, together with constant, intense nausea, and the symptoms denote progressive increase in the gravity of the affection. The author has met with an instance in which, from an exceptional prominence of vomiting and purging, acute peritonitis was mistaken for sporadic cholera. Abdominal tenderness, fever, tympanites, generally characterize acute peritoneal inflammation; yet, it is to be borne in mind that the disease is sometimes latent as regards these characteristic symptoms.

Treatment of Sporadic Cholera.

The treatment of sporadic cholera in the adult is simple and effective. Inasmuch as the stomach and bowels are freely evacuated spontaneously at the outset, there is no occasion for evacuant remedies. The object of treatment is the arrest of the gastro-intestinal transudation, together with the acts of vomiting and purging. This is accomplished usually without much delay by an opiate. If given per orem a salt of morphia is to be preferred on account of the promptness of its effect, and the facility of administration. A quarter or a half of the sulphate of morphia may be placed dry upon the tongue shortly after the occurrence of an act of vomiting. If no effect be produced in an hour, the dose may be repeated. Laudanum may be used if a salt of morphia be not at hand. This is best administered by enema, in half drachm doses. The laudanum should be given in a little boiled starch liquid or mucilage, very soon after an act of purging. Morphia given hypodermically is more rapid in its effect, and more reliable, inasmuch as the opiate given by the mouth or rectum is liable to be immediately rejected. The quantity injected should be from an eighth to a sixth of a grain.

A sinapism or warm stimulating fomentations may be applied to the abdomen.

An important part of the treatment is to withhold, as far as possible, the ingestion of fluids until the vomiting and purging are arrested. An intense thirst leads patients, in the intervals between acts of vomiting, to ask for cold drinks. The thirst may be in a measure allayed by rinsing the mouth with cold water, and swallowing small pieces of ice. The restriction in taking fluids may be diminished soon after the arrest of vomiting.

Some reserve in the ingestion of food is proper for a day or two after an attack of sporadic cholera; but it is surprising, in view of the violence of the symptoms, how speedily the digestive organs are capable of resuming the exercise of their functions.

INFANTILE CHOLERA.

The term cholera infantum, as used often in this country, embraces cases of functional diarrhœa, and colo-enteritis, as well as a truly choleraic affection. A popular synonym is "the summer complaint." Properly restricted, the name denotes a functional disorder having the symptomatic characters of sporadic cholera, the prominent diagnostic symptoms being purging and vomiting. As a rule, diarrhœa precedes the vomiting for a variable period. The dejections, at first fecal or lienteric, become serous or watery, and are more or less profuse. Children under two years of age are chiefly affected.

The affection is one of much greater gravity than sporadic cholera in the adult. If not controlled, it may lead speedily to great prostration, feebleness of the circulation, coldness of the surface, in short, to collapse and death. Under these circumstances, the characters of the disease approximate so closely to those of epidemic cholera, that, were the latter prevailing, it would be difficult to make the differential diagnosis. If recovery do not take place within a brief period, colo-enteritis becomes developed.

Treatment of Infantile Cholera.

Considering the danger in cases of infantile cholera, the treatment should be prompt and efficient. The importance of securing the removal of irritating contents of the stomach and intestines by an emetic and purgative, is generally inculcated. As in the adult, however, this object is in most instances accomplished by the spontaneous acts of vomiting and purging. As a rule, in order to gain time, as well as to avoid the harm arising from an emetic and cathartic if they be not required, it is safest at once to arrest, if possible, the affection. This end is to be effected by the same measures of treatment as in cases of sporadic cholera in the adult. Opium is the remedy to be relied upon. It is a remedy, however, which in children is to be given with circumspection. All risk of narcotism is to be avoided. The best plan is that advised by Prof. J. Lewis Smith, namely: to a child a year old, a drop of laudanum may be given every two or three hours, and the effect watched. The administration by hypodermic injection is not advisible. If the remedy taken by the mouth be not retained, it may be given by the rectum, the dose being doubled. Warm fomentations should be applied over the abdomen. Until the vomiting and purging are relieved, the ingestion of liquids should be restricted. If the gums be swollen and reddened, they should be freely divided.

The danger, other things being equal, is proportionate to the profuseness of the serous or watery dejections. If the quantity be moderate, and other symptoms mild in proportion, the paregoric elixir, given with the chalk mixture, or Dover's powder and the carbonate of bismuth, may be sufficient to arrest the disorder.

The dietetic and hygienic treatment after the choleraic symptoms cease, is especially important. If the child be not nursing, the basis of the diet should be milk, which is to be scalded and properly diluted with lime-water. Water should be given freely, so that the child shall not over-nurse or drink milk too freely in order to quench thirst. To secure digestion, pepsin, a few drops of brandy several times during the day, and tonics are indicated. As the affection occurs chiefly in the summer months, the child should be kept in the open air much of the time. The affection and its sequels are vastly more frequent in cities than in the country. If, therefore, recovery be not speedy and complete, removal to a salubrious rural situation is to be advised. The mortality among the children of cities would be greatly diminished by a timely resort to this measure, and also by effectual provisions for the supply of pure milk for those to whom the advantages of removal to the country are denied.

INTESTINAL PARASITES. HELMINTHIASIS.

The parasitical productions within the intestinal canal, which, with our present knowledge, are of practical importance, are the following: The ascaris lumbricoides, or round-worm; the oxyuris vermicularis, or thread-worm; the tæniæ, or tape-worms, and the bothriocephalus latus; the anchylostomum duodenale; the tricocephalus dispar, or whip-worm; and the trichina spiralis. The diagnosis and treatment of these different species of worms will be considered in the order in which they are enumerated.

Ascaris Lumbricoides, or Round-Worm.

This worm is cylindrical in form, from four to fourteen inches in length, and of a brownish, yellowish, or reddish color. Its habitat is the small intestine. It migrates sometimes to the stomach, and may be expelled by acts of vomiting. The proof of its existence is generally its presence in the dejections. It is rarely single, and, therefore, from its being found in the dejections, the inference is that there are others in the intestine. The number existing in different cases is very variable; it is sometimes large, amounting sometimes to a hundred or even more. For practical purposes, it is unnecessary to search the fecal evacuations by means of the microscope for their ova. If their presence be suspected, a tolerably active cathartic may be given, and one or more of the worms will be likely to be found in the dejections. If, after a cathartic have been repeated once or twice, none be found, it is fair to conclude that they do not exist. In this country they are much oftener found in children than in infants and after the age of childhood, but they may be found at any period of life.

The symptoms are unreliable. Itching of the nose, colic pains, an offensive breath, grinding of the teeth in sleep, should excite suspicion, but they do not warrant a positive diagnosis. Whenever there are grounds for suspecting their existence, a cathartic should be given, and the evacuations examined. If the suspicious symptoms continue, the cathartic should from time to time be repeated. This is the more advisable from the fact that patients, or, in cases of children, parents or nurses, are apt to attribute various symptoms to worms; and it is never safe for the physician to assert that they do not exist, more than it is safe to declare from symptoms that they are present. In short, there is no basis for a positive diagnosis but their being found in the evacuations.

Treatment.

The lumbricoid worms are easily destroyed and expelled. A vermicide anthelmintic remedy is to be followed by a brisk cathartic, the latter acting as a vermifuge. Of the remedies which destroy the worms (vermicides), santonin (santonic acid) and the oil of wormseed (chenopodium) are to be preferred. The former is the more effective, and is by far the less disagreeable. To an adult, three grains may be given three or four times during the day; to a child, according to the age, from half a grain to a grain and a half. During the days that the remedy is given, the diet should be restricted, and its effectiveness is more certain if a laxative of castor oil be prescribed. Calomel and jalap, with aromatic powder, is an eligible cathartic (vermifuge). This is to be given on the third or fourth day after commencing the doses of the vermicide. Troches of santonin, each containing half a grain, is a convenient form of administration. If the oil of wormseed be selected, from five to ten drops three times daily to a child under three years of age, and from ten to fifteen drops after this age, are to be given, followed by calomel and jalap or castor oil on the third or fourth day. An infusion of pinkroot (spigelia) and senna was formerly much employed; but, inasmuch as it is a less reliable, as well as a disagreeable remedy, its use has been superseded by santonin.

The sources of the introduction of these worms, or their ova, into the body are not as yet ascertained. Consequently, the preventive measures are not known. Facts render it probable that the prophylaxis is secured by a pure water-supply for drinking and cooking. If the purity of water be not certain, it should be filtered or boiled before being used.

Oxyuris vermicularis, or Thread-Worm.

This parasite, popularly known as the pin-worm, is thread-like in size, the length varying from one-sixth to one-half inch. According to Heller, it does not, as is generally supposed, inhabit exclusively the rectum, but its place of abode is especially the cæcum. To quote his expression, the vermiform appendix is a favorite "hiding place." Carried downward into the rectum with the feces, the presence of a considerable number of the worms in this situation occasions much annoyance. The patient is tormented by itching sensations caused by their movements. They are troublesome especially at night. In women they sometimes migrate into the vagina, causing pruritus in this part, exciting in some cases sexual desires and leading to masturbation. Pruritus ani should always excite suspicion of the existence of thread-worms, and lead to proper examinations to discover them. Their existence should be suspected when young children are restless at night, and are in the habit of carrying the hand to the anus.

The diagnosis may always be determined by ocular proof. If the evacuations be examined, the worms are seen adherent to the feces. They may be few or very numerous. Their movements may be quite active if the evacuations be inspected immediately after having been passed. To make sure of their presence or absence, a dose of castor oil may be given, and the evacuations produced thereby examined, or the contents of the rectum may be removed by an injection of cold water. Characteristic ova in the feces, or in mucus scraped from within the rectum, are to be found on microscopical examination, but this is quite unnecessary as regards diagnosis. If the worms be present in sufficient number to occasion any symptoms, they will be found in the evacuations, especially after a purgative or an enema has been given. They are much more frequent in children than in adults, but no age is exempt from the liability to become infested by them.

Treatment.

The worms within the rectum are easily destroyed by injections of a solution of common salt, an infusion of quassia, or water containing a small quantity of carbolic acid (grs. xx to Oj). A full dose of castor oil given before the injections are employed, will dislodge the worms from the cæcum and colon, and bring them within reach of the fluid injected into the rectum. This treatment is to be repeated whenever the symptoms denoting the presence of the worms in the rectum return. If this treatment fail, that is, if the worms be not effectually destroyed, the injections should be made by means of a long flexible tube. For this purpose a solution of castile soap may be employed.

TÆNIÆ OR TAPE-WORMS.

For all practical purposes, the tæniæ which infest the human species may be considered as consisting of three varieties, namely, the armed tape-worm (tænia solium), the unarmed tape-worm (tænia medio-canellata vel saginata), and the bothriocephalus latus. The latter, although differing from the two varieties previously named sufficiently to be considered a distinct species, in a therapeutical point of view belongs in the same category. Its geographical distribution is so limited, that, for this reason, it has but little importance; but, as regards symptoms and treatment, it would be unimportant to consider it separately. Of the three varieties of tape-worm, the tænia solium is the most frequent in this country. With respect to its frequency, it is not common, but by no means extremely rare. The name tænia solium implies that it is a solitary parasite, in other words, that it occurs singly. This is true of each of the varieties, as a rule, but there are exceptions to the rule. Heller states that he has met with twenty-eight worms expelled in a mass, and that as many as forty have been known to exist together in the same patient. The different varieties sometimes coexist. These exceptions are among the curiosities of clinical experience. Heller's view that a tape-worm is not to be regarded as one animal, but as a colony of animals seems to be correct. A mature segment is, in fact, a distinct hermaphroditic animal.

Tape-worms give rise to no symptoms which can be relied upon for the diagnosis. Not infrequently, they occasion no appreciable symptoms whatever. Their existence is discovered in persons who are apparently in perfect health. It is not easy to understand how they can occasion any marked inconvenience, beyond the imbibition of nutritive material which would otherwise go to the nutrition of the patient; and in a person who ingests an abundance of aliment, the amount deducted for the support of the parasite is not felt. There is probably no ground for its supposed connection with various disorders of the nervous system. It is easy to comprehend that, after the existence of the parasite is ascertained, disturbances may arise from the knowledge of the fact. These disturbances have a mental origin.

It is not uncommon for hypochondriacal patients to fancy the existence of a tape-worm. Every practitioner of much experience meets with such cases. The patient's conviction is entitled to no diagnostic weight. But to remove such a conviction is sometimes difficult. It is characteristic of certain cases of monomania.

The proof of the existence of a tape-worm is the expulsion of its mature segments. If a tape-worm exist, these may always be found in the dejections when they are examined for a considerable period. If this be done, and segments are never found, it is certain that a tape-worm does not exist. Whenever the question arises as to its existence, a brisk cathartic should be given, and the dejections examined. This may be repeated from time to time. The absence of ocular proof is positive as regards the exclusion of the affection.

Treatment.

The idea of the presence of a tape-worm, in most cases, is exceedingly repulsive. With proper treatment and co-operation on the part of the patient, the practitioner may confidently expect success. The treatment embraces remedies known as *tænicides*, and certain preparatory measures; the latter are important to success. The treatment is to be commenced by a laxative, the object being removal of the contents of the intestine, without the expulsion of any portion of the worm. A moderate dose of castor oil, or a mild saline, fulfils this object. Next a tænicide is to be selected. There are several remedies which are destructive to this parasite. The most efficient of these are the male fern (Filix mas), the bark of the pomegranate root, the kousso (Brayera), pumpkin seed (Pepo), and turpentine. Of these, the male fern, kousso, or pumpkin seed, is to be preferred. So far as the author's experience goes, the male fern is the most reliable.

Assuming the male fern to be selected as the tænicide, the bowels being moved on the first day of the treatment by a mild laxative, the diet of the patient should be restricted to beef, mutton, or chicken broth. The dietetic part of the treatment is important, the object being to weaken the parasite by starvation. The animal broths being absorbed chiefly in the stomach, the presumption is that the parasite is not nourished by them. On the second day, the patient fasting, or an animal broth only being allowed, half a fluidrachm, or a drachm, to an adult, of the oil of male fern is to be given in the morning, in mucilage. The dose is to be repeated in four hours. During the day, only animal broth, coffee or tea, or an alcoholic stimulant, if desired, are to be allowed. If the doses of the male fern do not produce a cathartic effect, and bring away the worm, a brisk purgative is to be given at evening. The latter may be either a full dose of castor oil, calomel and jalap, or croton oil.

The success of the treatment is shown to be complete if the head of the worm be expelled. In order to determine this point, the worm should be carefully examined at the tapering extremity under the microscope. If the head be not found, the success of the treatment cannot be ascertained until sufficient time elapses for the development of new, mature segments, and their expulsion from the bowels. The time required is about three months. If, after this period, no segments be discovered, the treatment has proved successful. Not infrequently, although the head be not found, if, from the small size of the tapering extremity, it be evident that the detachment is very near the head, the parasite is destroyed, and the success of the treatment is complete.

Should the treatment fail to bring away a considerable portion of the worm, it may be repeated after an interval of a few days.

Heller considers the kousso as the most efficient of the tænicides. He advises, on the day previous to the treatment, a plateful of herring salad, composed of finely cut salt herring, with plenty of onions, and, for those who like it, garlic. This is ordered on the supposition that the constituents of the salad are "unpleasant to the worm."

The quantity of the remedy requisite for the expulsion of the tænia solium, according to his experience, is five drachms. This is to be taken in compressed balls or disks, coated with gelatine, in the morning, within an hour. Two hours after the last dose, a couple of spoonfuls of castor oil are to be given. He states that the worm is often expelled within an hour or two after the administration of the oil, but occasionally not until evening, and very rarely not before the following morning.[1]

The bark of the pomegranate root, Bartholow states to have proved in his experience a very certain tænifuge. "The rind of the fresh root only should be used." A decoction is made by boiling gently two ounces of the bark in a quart of water down to a pint. A wine-glass is to be given hourly until the whole quantity is taken. If the remedy do not purge, it should be followed by a brisk cathartic.[2] The efficiency of an emulsion of pumpkin seed is attested by many physicians in this country. This remedy has the advantage of being less perturbatory than other tænicides, and it may therefore be repeated several days in succession. An emulsion is made by pounding in a mortar two ounces of the fresh seeds divested of their envelopes, adding half a pint of water, and straining. The whole is to be taken within a couple of hours, and a dose of castor oil given a few hours afterwards.

Turpentine is often efficacious, but it is less reliable, and is apt to excite more disturbance than the other tænicides which have been named. From half an ounce to an ounce, or even more, may be given to an adult. It should be either combined with, or quickly followed by, castor oil, in order to prevent its effects upon the kidneys and bladder.

Cases have recently been reported in which carbolic acid has proved successful, given in doses which occasion little or no disturbance of the digestive system. From half a grain to a grain may be given hourly through the day, if tolerated without inconvenience, and at night, or on the following day, a purgative should be administered. This treatment may be repeated on successive days until the entire worm is expelled.[3]

The importance of the preparatory treatment in the employment o each of the foregoing remedies is to be borne in mind. Prior to thei administration, the intestinal contents should be evacuated, and the die for twenty-four or forty-eight hours should be restricted to articles whic are not alimentary as regards the parasite. A brisk cathartic following the tænicide is, also, often essential to success. The objects are, first, to weaken the worm by starvation; second, to destroy it by toxical agents; and, third, to cause its expulsion by a purgative.

---

[1] *Vide* Ziemssen's Cyclopædia, Am. ed., vol. vii. p. 700.

[2] *Vide* Materia Medica and Therapeutics, page 457.

[3] *Vide* case reported by Surgeon Bell, U. S. Army, in the N. Y. Med. Record, Nov 15, 1873; and case reported by Dr. J W. Brown, in same Journal, No. for Dec. 22, 1877.

Prophylaxis.

The tænia solium is the result of the ingestion of meat, generally pork, which contains the cysticercus cellulosæ. The inspection of meat is not to be relied upon for determining the presence or absence of the parasite in this embryonic stage of its existence. The preventive treatment must consist of either avoiding pork as an article of diet, or taking care that it be thoroughly cooked before it is eaten. To prevent swine from becoming infected with the embryo, they should never be allowed access to human excrement or dung-heaps.

The unarmed tape-worm is the result of the ingestion of the embryo generally contained in beef. The use of beef in a raw state involves a liability to its production. For this reason the propriety of advising raw meat is questionable. The cysticercus may not have lost its vitality in very rare meat.

Heller calls attention to the use of the contents of sewers for fertilizing land as a source of the introduction of the embryo into the bodies of cattle.

As the sources of the introduction into the body of the ova or embryos of the bothriocephalus latus are not as yet positively ascertained, the prophylaxis does not rest on the same solid etiological foundation as with regard to the two varieties of tænia. Facts seem to point to fish and fish-eating birds in certain countries as the probable sources. Inasmuch as this parasite is not encountered in this quarter of the globe, the measures of prevention, as well as the treatment, are not of practical consequence.

ANCHYLOSTOMUM DUODENALE.

The following account of this parasite is derived from Heller's Treatise on Intestinal Parasites.[1] This author states that it is common in certain of the Southern States of the Union, namely, Alabama, Georgia, Florida, and South Carolina. Clinical facts in regard to its prevalence, its pathological effects, and the diagnostic symptoms which accompany it, are desirable. It may be found that in some of the cases of so-called idiopathic or pernicious anæmia, the presence of this parasite is the cause of the affection. It is a frequent parasite in Northern Italy and in Egypt. It is supposed to be the cause of the disease known as Egyptian or tropical chlorosis. It prevails more or less in Brazil, the West Indies, Guiana, and Algiers. Its geographical distribution appears to be confined to warm climates.

These parasites, thread-like in size, and from half an inch to an inch in length, inhabit the duodenum and jejunum. Attaching themselves to the mucous membrane by claw-like hooks, they fill themselves with blood by suction, the mouth acting like a cupping glass. The number present in the intestine varies from several hundred to many thousand.

---

[1] *Vide* Ziemssen's Cyclopædia, American edition, vol. vii.

It is easy to understand that these miniature leeches, existing in immense numbers, withdraw sufficient blood to occasion anæmia. Moreover, hemorrhage may ensue from the minute punctures of the mucous membrane at the points of their attachment, in the same way as blood continues to flow from the bite of the leech after it falls off. Hence bloody mucus is found in the intestine after death, and the hemorrhage may be sufficient to appear in the dejections.

The chief symptoms are those attributable to the anæmia. Pains and a sense of weight are referred to the epigastrium. As a rule, the symptoms progressively increase in severity, and, after a period varying from a few weeks to several months and even years, death takes place preceded by general dropsy, diarrhœa, and constant vomiting.

The worms or their ova have not as yet been found in the dejections. The abode of the parasite being in the upper part of the small intestine, it may be that the microscope fails to afford a demonstrative diagnosis, owing to changes which the animal and its eggs undergo in passing through the intestinal tract. Further observations may, however, prove successful. It remains to be ascertained to what extent cases of progressive pernicious anæmia are instances of this affection. Heller embraces among the symptoms geophagia or dirt eating. Observations have shown that this parasite infests especially the African race, and it is not improbable that it exists in the cases of chthonophagia which is a frequent affection among the negroes of the South. In the present state of our knowledge the diagnosis can only be conjectural.

Treatment.

If a diagnosis of this affection could be made before it has led to great exhausation, it is probable that it would be amenable to treatment. The primary object, of course, is the destruction of the parasites. Theoretically, or rather, reasoning from analogy, carbolic acid should be effective. The toxical remedies which are especially destructive of this parasite have not as yet been determined by clinical experience.

Prophylaxis.

Facts render it probable that this parasite, in tropical climates, inhabits puddles of dirty water. Security against its entrance into the body, therefore, is obtained by drinking water either from pure sources, or which has been purified. Further information concerning the etiology with reference to the prophylaxis, is a desideratum.

Tricocephalus Dispar.

This parasite, called also the whip-worm, thread-like in size, and from half an inch to an inch and a half in length, inhabits chiefly the cæcum. With our present knowledge, in a medical point of view, it claims only a passing notice. In small numbers it is frequently found after death, especially in cases of typhoid fever. It exists sometimes in large numbers. The sources whence it is derived, the symptoms to which it may give rise, its pathological importance, and the agencies by which it is destroyed, are not, as yet, determined.

TRICHINA SPIRALIS. TRICHINIASIS. TRICHINOSIS.

Since the famous case studied by Zenker in 1860, the presence in the human body of the parasite called trichina spiralis, which, prior to that date, had been regarded as innocuous, has been recognized as the cause of a fearful disease. This recent nosological acquisition is known by the names trichiniasis, trichinosis, and the trichinous disease. Existing encapsulated in the muscles of swine, if lean pork be eaten either raw or imperfectly cooked, the worms are set free within the stomach and intestines. They rapidly develop, copulate, and multiply. From the alimentary canal they migrate and establish themselves within the fasciculi of the voluntary muscles throughout the body. Their presence in immense number within the stomach and intestines occasions symptoms referable to the digestive system, and, having invaded the muscles, they give rise to intense muscular pains and fever, together with other symptoms denoting grave constitutional disturbance. The disease, if severe, ends fatally in a large proportion of cases. A natural division of the course of the disease is into the period when the symptoms proceed from the presence of the parasites within the alimentary canal, and the period which dates from their migration into the muscles.

After the ingestion of trichinous pork, there are no marked symptoms until the production of offspring by the parasites introduced with the food. The new brood appears within a week after the introduction of the parents. The disease commences with the emigration of the young worms, that is, their passage into the mucous membrane. They begin to leave the alimentary canal a few days after birth. A chill, or repeated chilly sensations, may precede and accompany the gastric pain or uneasiness, anorexia, then nausea, and sometimes vomiting, which are the symptoms referable to the digestive system. With these symptoms are associated rise of temperature and increase of the frequency of the pulse. Diarrhœa speedily follows, generally preceded by constipation. After a few days, muscular pains are prominent. The muscles of the extremities are painful, especially on extension, so that a flexed position is maintained. The muscles are also tender to the touch and swollen. In severe cases the suffering from muscular pain is great. There is a notable increase of the intensity of the fever. Œdema of the face and limbs is a very constant symptom. Profuse sweating occurs in the great majority of cases. In some cases, dyspnœa is a prominent symptom, arising from the presence of trichiniæ in the diaphragm and intercostal muscles. This may prove the immediate cause of death. Their presence in the muscles of the larynx may cause more or less impairment of voice or complete aphonia. Impaired hearing may be caused by the presence of trichinæ in the stapedius muscle. Movements of the eyeball are sometimes painful from the presence of the parasites in the ocular muscles. Herpetic and pustular eruptions during the progress of the disease are not uncommon.

With our present knowledge, the recognition of this disease is not difficult when several or, as has happened repeatedly, a large number of persons are attacked after having eaten uncooked or imperfectly cooked pork. The liability to error in diagnosis is limited to instances in which one person only is affected. The gastro-intestinal symptoms, followed by muscular pains, fever, sweating and œdema, are highly characteristic. Corroborative proof of the character of the disease is obtained if portions of the meat of which the patient or patients have partaken be examined microscopically, and the presence of trichinæ ascertained. A demonstrative diagnosis may be made by removing a small piece of a painful muscle, either by incision or harpooning, and ascertaining the presence of trichinæ by the microscope. The presence of trichinæ in the dejections is also demonstrative ; but this proof is rarely available. There is nothing distinctive in the taste of trichinous pork. A person who recovered from the disease, informed the author that he was led to eat freely of an uncooked trichinous ham from the fact that it was peculiarly savory.

Treatment.

The chief object of treatment in the first stage of the disease is the destruction of the parasites within the stomach and intestinal canal. Efficient toxical agents are to be ascertained by future observations. The efficacy of benzine, proposed by Mosler, of Berlin, has not been substantiated by clinical experience. From its potency as a remedy destructive of other intestinal parasites, carbolic acid deserves a fair trial. The retention of this remedy in doses sufficient to render it an efficient tænicide, warrants the supposition that it may prove destructive to trichinæ. Purgatives to expel the worms are rationally indicated. The purgatives selected should be from those which act upon the upper part of the alimentary canal. Calomel and jalap form a good combination. To destroy or expel the parasites is an object of treatment while the symptoms denote their presence within the stomach and intestines. These symptoms sometimes continue after the muscular pains, fever, etc., show that migration to the muscles has taken place.

Aside from the treatment indicated by the presence of the parasites within the alimentary canal, the objects are palliation and support. The muscular pains are to be relieved by soothing embrocations and anodynes. The diet should be nutritious, and the vital powers sustained by tonic remedies and alcoholics. Incidental events, *e. g.*, dyspnœa, œdema, sweating, and complications, are to be treated according to symptomatic indications.

Other things being equal, the gravity of the disease and the danger depend on the number of parasites introduced and of their progeny. The disease, in some cases, is mild and unattended by danger. In these cases, convalescence takes place in from three to six weeks. In cases which prove fatal, death takes place within about the same limits. In severe cases ending in recovery, health is not restored for several months.

The prognosis is more favorable in children than in adults. In favorable cases, the local and general symptoms slowly subside, the affected muscles remaining for a long time tender and more or less painful, the latter symptoms ceasing after capsulation of the parasites is completed.

Prophylaxis.

The prevention of the introduction of living trichinæ into the human body is perfectly practicable by means of very simple precautions. So far as is now known, the parasites are invariably derived from one source, namely, trichinous pork. Of course, complete security is obtained by excluding altogether lean pork from the diet. This restriction, however, will rarely be submitted to, except by those who refrain from religious scruples. The security is equally complete if the meat be thoroughly roasted, broiled, or boiled. Trichinæ are killed by a temperature of 150° F. It is easy to determine by the appearance of roasted or boiled meat whether, or not, it be thoroughly cooked. Pork, salted or smoked, without being thoroughly cooked, is never to be eaten, nor, of course, sausages or other articles into which raw meat enters. It is important beyond measure that people of all classes should be made to understand the necessity of these precautions in order to avoid risk of contracting one of the most fatal of diseases.

The prophylaxis embraces precautions against the sale of trichinous pork. The latter requires a microscopical examination of every hog slaughtered for food. This precaution, at least in the United States, is impracticable. Even if a law providing for such an examination were enforced, unless the examination were thoroughly made by competent microscopists, the occurrence of the disease would be favored by a false security. In order to prevent swine from becoming affected with the disease, it must be first ascertained whence they derive the parasite. With regard to this point of inquiry, investigations show that the chief sources are, dead rats which have become diseased by eating trichinous pork, and the refuse meat, in slaughtering places, which is usually given to swine. Other sources much more rare, if not problematical, are the excrement of rats, swine, and man affected with the trichinous disease. The obvious precautions derived from these etiological facts are, to exterminate, if possible, rats in the neighborhood of slaughter houses, piggeries, and styes, destroy all the refuse matter remaining when pigs are slaughtered, and to prevent swine from having access to fecal excrement.

VII.

DISEASES OF THE LIVER.

Following the same arrangement as in treating of diseases of the stomach and intestines, the diseases of the liver are distributed in three groups distinguished, severally, as inflammatory, structural, and functional. These three groups will be considered in the order in which they are named.

Abnormal variations in the size of the liver are incident to each of these groups. Certain hepatic diseases involve also deviations of form, either in a part or the whole of the organ. With reference to diagnosis, therefore, it is essential to know the normal situation, dimensions, and anatomical relations of the liver as determinable by physical exploration. Situated in the right hypochondrium, the upper border of the liver is in relation to the lower lobe of the right lung, the diaphragm intervening; the lower anterior border is in relation to the transverse colon and stomach; the left lobe extends to the præcordia about two inches to the left of the median line, and the posterior lower border corresponds to the upper part of the right kidney.

By percussion, the situations of the upper borders of the liver are easily ascertained with accuracy. Anteriorly, on the linea mammalis, at or near the sixth rib, percussion gives flatness showing that the liver is in contact with the thoracic wall. This is known as the line of hepatic flatness. The resonance for from one to two inches above the situation of flatness, is dull, owing to the convexity of the upper surface of the liver. The limit of this dulness upward is called the line of hepatic dulness. On a line passing vertically through the infra-axillary region, hepatic flatness is at, or near, the eighth rib. On the posterior aspect hepatic flatness is at, or near, the eleventh rib. It is to be borne in mind that the situations of the upper borders of the liver vary somewhat within healthy limits, owing to normal variations in the volume of the organ. They differ considerably at the end of a deep inspiration as compared with the effect of a forced expiration. They are lower in a standing position than when the body is recumbent. They are affected by various conditions, in health and disease, which are situated below, pressing the organ upward, or, much more rarely, causing it to descend. The latter is caused by morbid conditions situated above, namely, pleurisy with effusion, empyema, tumor in the chest and emphysema.

The lower extremity of the liver does not extend below the false ribs. Its situation on the anterior aspect of the trunk is determined approximately by ascertaining the dividing line between hepatic flatness and tympanitic resonance, the latter due to the presence of gas within the transverse colon. This is not very reliable owing to variation in the amount of gaseous distension of the transverse colon, and to the fact that the tympanitic resonance is transmitted more or less above the intestine.

It is not uncommon for the pulmonary resonance and the tympanitic resonance to meet, that is, hepatic flatness on the anterior aspect of the chest is abolished. The small distance between the pulmonary and tympanitic resonance is apt to lead to error in inferring therefrom an abnormal diminution of the volume of the liver. The vertical diameter of the liver on the nipple line is about four inches. If the liver extend below the false ribs, its lower margin is best ascertained by palpation. The sense of resistance felt by pressure with the fingers over the organ is abruptly lost after the margin has been reached. In some cases this evidence afforded by palpation is not readily available owing to contraction of the abdominal muscles when the pressure is made. Generally, by perseverance this difficulty may be overcome. To facilitate the exploration, the person examined should be upon the back, the lower limbs should be flexed, and the abdominal muscles voluntarily as relaxed as possible. Impacted feces in the transverse colon sometimes simulate enlargement of the liver in a downward direction. The liver may be depressed so that its lower margin extends more or less below the false ribs by a collection of liquid, or air and liquid (pleurisy and pneumo-hydrothorax), in the right pleural cavity, and by pericardial effusion. The organ is sometimes pressed downward by tight lacing, or by the habit of wearing a belt constricting the lower part of the chest. Cases have been reported in which this effect was caused by a collection of liquid below the diaphragm, between it and the upper surface of the liver.

If the liver be enlarged, it is practicable, when the abdominal walls are thin and relaxed, to ascertain by palpation whether the lower margin be sharp as in health, or blunt, and also, whether the surface below the ribs be smooth or nodulated. These are points involved in diagnosis. Sometimes when the walls of the abdomen are greatly relaxed, as after delivery or the operation of paracentesis, the fingers may be carried upward beneath the ribs and these diagnostic points determined.

Dislocation of the liver downward, independently of any apparent pressure from above, for example empyema, is described by writers under the name wandering liver (hepar migrans). According to Theirfelder, nine cases have been reported, the first by Cantani in 1866. Two of these admit of doubt as regards the diagnosis. In none was there an opportunity to confirm the diagnosis autopsically.[1] In all, the patients were women who had borne children. The diagnosis is to be based on the following points determinable by physical examination: The presence of a solid body below the ribs, presenting the peculiarities of the liver as regards form, fissures, lower border, etc. A tympanitic resonance on percussion above the flatness caused by the organ below, and distinct from the pulmonary resonance, and the ability to restore by pressure the organ to its normal situation. A wandering liver occasions more or less inconvenience. The treatment consists in keeping the organ in its normal situation by means of a belt or mechanical supporter.

---

[1] *Vide* Handbuch der Speciellen Pathologie und Therapie, von Ziemssen, 1878.

INFLAMMATORY DISEASES OF THE LIVER.

ACUTE PARENCHYMATOUS OR DIFFUSE HEPATITIS, SUPPURATIVE HEPATITIS, AND ABSCESS OF THE LIVER. INTERSTITIAL CHRONIC HEPATITIS. SYPHILITIC HEPATITIS.

Acute, Diffuse, or Parenchymatous Hepatitis. Acute yellow Atrophy.

Adopting the view now generally held by pathologists, and which, in a clinical point of view, is rational, acute, diffuse, or parenchymatous hepatitis and yellow atrophy of the liver are considered as one affection. The latter has been called grave or malignant jaundice. Acute hepatitis is exceedingly rare. It is less so in tropical than in temperate or cold climates. Our knowledge of its etiology is not sufficient for assistance in the diagnosis to be derived from this source.

The gravest form of the affection, in which occur the anatomical changes constituting yellow atrophy, is exceptionally developed without prodromic symptoms. Usually the symptomatic characters are preceded by loss of appetite, nausea, vomiting, etc., which denote a gastro-duodenitis. In connection with these symptoms, jaundice occurs, and, for a variable period, the case may seem to be one of simple jaundice from an extension of duodenal inflammation into the ductus communis. The pulse may be but little, if at all, increased in frequency, owing to the sedative effect of the cholæmia upon the circulation. The temperature of the body is more or less raised, but the increase is rarely great. The fever is accompanied by much pain in the head and inability to sleep.

The characteristic symptoms which supervene are attributable to arrest of the excretory function of the liver, owing to destruction of the hepatic cells. These symptoms are delirium, in some cases convulsions, and coma. They are toxical effects of the retention in the blood of the excrementitious portion of the bile, namely, cholesterine. This morbid condition of the blood is expressed by the terms acholia and cholesteræmia. The condition in its pathological character is analogous to uræmia. The cholesteræmic symptoms are not in proportion to the intensity of the jaundice. The latter, which is usually not intense, is caused by the resorption of bile ; the former are effects of defective excretion. The jaundice sometimes disappears, while the cholesteræmia persists.[1]

The associated symptoms are hemorrhage in different situations, namely, in the stomach, intestines, uterus, and sometimes the kidneys ; petechiæ in some cases ; feebleness, variableness, and irregularity of the pulse ; the presence of bile pigment in the urine, sometimes albumen in small quantity, together with crystals of leucine and tyrocine. The febrile temperature varies in different cases and at different times in the same case, within wide limits.

The foregoing are the symptoms in severe cases heretofore embraced under the name acute yellow atrophy of the liver, so called from the color of the organ after death, with a remarkable diminution of its volume and consistency, the microscope showing disorganization involving destruction of the hepatic cells. The termination in these cases is uniformly fatal after a duration of from one to four weeks.

---

[1] *Vide* Jaccoud's Traité de Pathologie Interne, cinquième édition, 1877, tome second, page 349.

The diagnosis is to be based on the order of events, as just stated—on notable tenderness on pressure over the liver, and on the diminution of the volume of the organ as determined by percussion; the latter, however, although highly characteristic when it occurs, is not an invariable effect of the disease. Considerable diagnostic importance is attached to the presence of leucine and tyrocine in the urine.

Diseases to be excluded are suppurative hepatitis from thrombosis of the portal vein, embolism, obstruction of bile-ducts by calculi, or in some rare cases by lumbricoid worms, and uræmia. The exclusion of these diseases is not always easy, and each may be associated with acute parenchymatous hepatitis.

Acute hepatitis has not always the gravity of the form of the disease just considered. The characteristic symptoms of the latter, namely, delirium, convulsions, and coma, may be wanting, and the prognosis is less unfavorable. The difference depends on the occurrence or non-occurrence of disorganizing changes which destroy the functional ability of the liver as an excretory organ. In cases which do not involve these changes, the organ is enlarged from hyperæmic and interlobular exudation. The patient complains of a sensation of weight, and of distension in the right hypochondrium. There is more or less tenderness over the region of the liver. Acute pain is felt if the disease become complicated with perihepatitis; otherwise the pain is either dull or wanting. Jaundice may, or may not, occur. The symptomatic fever is of moderate intensity. Some of the cases in which the affection is regarded as active hyperæmia or congestion of the liver, are, probably, cases of hepatitis, ending in resolution. This form of the disease, as well as the graver form, is exceedingly rare, at least in this country. It is far more rare than would be inferred from the number of instances in which it is supposed to occur in the practice of some physicians.

Treatment of Acute, Diffuse, or Parenchymatous Hepatitis.

In cases presenting the symptoms of the grave form of the disease, that is, of acute yellow atrophy, recovery is not to be expected under any method of treatment. The only ground for hope, in these cases, is that the diagnosis may be incorrect. Rationally it is an object to eliminate cholesterine vicariously from the system. The practicability of accomplishing this object is not ascertained. Analogy points to the kidneys, intestinal tube, and the skin as the situations in which a vicarious elimination may be practicable. With our present knowledge the treatment is to be guided by the symptomatic indications in individual cases.

The treatment in cases which do not present the symptoms denoting suppression of the excretory function of the liver, involves the same principles as in other parenchymatous inflammations, *e. g.*, acute parenchymatous nephritis.

SUPPURATIVE HEPATITIS AND ABSCESS OF THE LIVER.

From a clinical point of view, suppuration within the liver occurs in two groups of cases. In one group the suppurative inflammation is clearly secondary; it is usually in the form of multiple abscesses of small or moderate size, more or less numerous, the existence of which is not positively determinable during life. The other group embraces cases in which generally a single abscess occurs of large and sometimes immense size, the pus, if life be sufficiently prolonged, making its way either outward to the surface or in some other direction, and a pathological connection with an antecedent affection not being evident. The cases in the latter group claim separate consideration; they will be considered under a distinct heading, namely, Abscess of the Liver.

Suppuration giving rise to purulent collections more or less numerous (pyæmic or metastatic abscesses) occur in pyæmia, especially if infective emboli are derived from a situation whence they enter directly into the portal system of veins. Thrombosis of the vena portæ (portal phlebitis) leads to these multiple collections of pus. In another work the author has cited a case in which numerous small abscesses were associated with portal thrombosis, the latter attributable to a fish-bone which had made its way into the portal vein.[1] Chills, occurring sometimes regularly, but oftener irregularly, with jaundice, rapid loss in strength and weight, frequency of the pulse, increase of the body heat—in short, pyæmic symptoms, with pain, tenderness over the liver, which is more or less enlarged, point to this rare affection. The diagnosis is rendered probable by the occurrence of these symptoms in connection with surgical operations or diseases of the rectum or of the uterus, and, in some cases, with the evidence of prior ulcerations within the large or small intestine. The affection ends fatally after a period ranging from one week to six weeks.

Palliative and sustaining measures constitute the treatment.

Suppuration at different points occurs in some cases in which death follows obstruction of the ductus communis from a biliary calculus. The suppurative inflammation, in these cases, may be associated with thrombosis of hepatic veins. The author has observed this connection.

ABSCESS OF THE LIVER.

Abscess of the liver, using the term as already defined (*vide supra*), is generally single, but occasionally there are two and sometimes three distinct collections of pus. The quantity of pus is sometimes enormously large. In a case which the author has cited in another work it amounted to nine quarts. The seat of abscess is oftener the right than the left lobe. If the opportunity be offered of examining the pus chemically and microscopically, it may be found to contain bile or fragments of tissue derived from the liver; but these are not always present, and the pus does not differ essentially from that occurring in other situations.

Circumscribed gangrene or sloughing may occur in connection with suppuration. On account of the great infrequency of such cases, the following instance, observed by the author, is introduced:—

---

[1] *Vide* Principles and Practice of Medicine, by the Author, 4th edition, page 556.

The patient, a laboring man, aged fifty-three years, was admitted into Bellevue Hospital September 17, 1877. Four weeks before his admission, while carrying a hod of bricks to the top of a building five stories in height, he was seized with nausea, retching, and some vomiting. Two days afterward he became jaundiced, and there was tenderness over the anterior aspect of the liver. The gastric symptoms and the jaundice gradually diminished. Five days before his admission he noticed a tumor in his right side. Up to this time he had kept about, but, owing to the pain in the seat of the tumor he was obliged to quit work. On admission, a round swelling was visible in the right hypochondrium, extending into the epigastric and slightly into the umbilical region. The surface at the centre of the swelling was reddened. Fluctuation was felt over the swelling, and a friction-fremitus. By means of a hypodermic needle a pyo-sanguinolent liquid was withdrawn. On the third day after his admission, aspiration was practised and four ounces of a sanguinolent liquid were removed. On microscopical examination, the liquid was found to contain sheaf-shaped, bile-stained crystals, cholesterine, and a few leucocytes. Chemical examination showed albumen and mucus, but no bile. On the fifth day the swelling had increased in size, and the patient suffered much from pain. The swelling on this day was freely opened, and a pint of dark liquid escaped. The liquid contained shreds of hepatic tissue, clots of blood, and a small quantity of pus. The patient was much relieved as regards the pain. On the sixth day the temperature was high (13°), vomiting took place, the pulse became rapid and feeble. He succumbed on the sixth day. On post-mortem examination, the liver was found to be enlarged, the lower extremity extending to a level with the umbilicus. Within the right lobe was a cavity occupying the greater part of this lobe. The cavity contained broken-down hepatic tissue, in large and small masses, with some clots of blood, and pus in small quantity. The hepatic ducts, hepatic artery, and portal vein presented nothing to account for the sloughing abscess. The stomach and intestines were free from ulceration or evidences of inflammation. The kidneys and spleen were normal.

There are no reliable diagnostic criteria of hepatic abscess prior to the appearance of a tumor, or the discharge of pus into some outlet. Irregular chills with fever, pain, dependent or circumscribed perihepatitis, and enlargement of the liver in some cases associated with jaundice, warrant a suspicion which should be much stronger in a tropical than in a cold or temperate climate, and when these symptoms either precede or accompany dysentery. But a positive diagnosis is not possible. If the situation of the abscess be near the anterior surface of the liver, a visible projection or swelling occurs sooner or later, unless, prior to peritoneal adhesions over the abscess, the pus be discharged into the cavity of the peritoneum, giving rise to fatal peritonitis. The tumor makes its appearance sooner when the abscess is in the left lobe of the liver, than when it is situated beneath the ribs. When fluctuation is perceived, the diagnosis lies between an abscess or a hydatid tumor. The differential points will be considered in connection with the latter. The presence of pus, however, may be determined demonstratively by an exploratory puncture. This may be resorted to before fluctuation is felt.

If the abscess be near the upper surface of the liver, peritoneal adhesions taking place prior to perforation of the diaphragm, the pus may be discharged into the pleural cavity. Empyema then occurs, and proves fatal, the existence of the abscess not being determinable before death. Generally, however, pleuritic adhesions are formed while ulceration of the diaphragm is progressing, and perforation of the lung taking place within the boundaries of the adherent pleural surfaces, the pus is discharged into the bronchial tubes and expectorated. A sudden and abundant expectoration of pus, not preceded nor accompanied by empyema, the existence of the latter being readily determined by physical signs, and abscess of the lung being in like manner excluded, the diagnosis is extremely probable. It is corroborated by antecedent and associated local symptoms referable to the liver, and it is made certain if bile elements, or particles of hepatic structure be found in the purulent expectoration. That the pus does not come from a vomica, nor from the bronchial mucous membrane, is rendered evident by the absence of the signs of phthisis and of bronchitis. Moist or bubbling râles are limited to the right side of the chest, denoting the presence of pus in the bronchial tubes, and if secondary bronchitis be produced, it is unilateral.

Situated near the inferior and left lateral surface of the liver, the pus may be discharged into the transverse colon or the stomach. The diagnosis is then to be based on the evacuation of the pus by vomiting or by stool, the antecedent and coexisting symptoms referable to the liver being taken into account.

The discharge of the pus into the pelvis of the kidney gives rise to pyuria, but that the source of the purulent discharge is the liver can hardly be determined. In the rare instances of the discharge taking place into the vena cava, and within the pericardium, the diagnosis is impossible.

A dilated gall-bladder is discriminated from hepatic abscess by the pear-shape form of the tumor, its situation below the lower border of the liver, and by a sense of resistance on pressure instead of the dough-like sensation accompanying the fluctuation from a collection of pus after it has produced a projection above the surface of the skin.

To distinguish from an abscess which is not hepatic, the following method may be resorted to: introducing a long needle into the abscess, the part above the integument will be moved by the diaphragmatic movements if the abscess be in the liver, and it will remain motionless if the abscess be not hepatic.[1]

Treatment of Hepatic Abscess.

It follows from what has been stated in relation to the diagnosis prior to the visible evidence of tumor, that, until this evidence is obtained, treatment cannot be employed with reference to hepatic abscess, inasmuch as its existence is not known. But, were the affection discoverable, the treatment should be governed by symptomatic indications. When the existence of abscess is determined, the object of treatment is the removal of the pus as soon as it can be done with prudence. If the abscess be seated beneath the ribs, the pus may be evacuated by a free incision as soon as fluctuation is felt. If the situation be in the left lobe, it has been considered a prudential measure to make an incision over the tumor without opening the abscess, in order to be sure that peritoneal adhesions have formed which will prevent the escape of pus into the cavity of the peritoneum. Aspiration may be employed in the latter, as well as in the former, situation without risk, and in fact, by diminishing in this way the pressure of the liquid, this operation probably lessens the danger of the abscess opening into the peritoneal cavity. A cure may be effected by repeated aspirations, but a free incision is more reliable. The opening should be maintained, and daily washing out of the cavity is advisable. Recovery takes place in cases in which the quantity of pus discharged is very great.

---

[1] Quoted from Sachs by Thierfelder, in Handbuch der Speciellen Pathologie und Therapie, von Ziemssen, Leipzig, 1878.

Supporting measures are indicated,—and these constitute the treatment when the contents of the abscess are discharged through the alimentary canal or the bronchial tubes. The prognosis is much more favorable if the abscess be in a situation to be opened externally, but recovery takes place in a certain proportion of the cases in which the opening takes place into the outlets just named. The existence of two or more abscesses impairs greatly the prospect of recovery.

Chronic Interstitial Hepatitis. Cirrhosis of the Liver.

Analogues of chronic interstitial hepatitis, are the fibroid, cirrhotic or contracting kidney, fibroid phthisis or cirrhosis of lung, sclerosis of the brain and spinal cord, induration of the stomach, scleræmia, pseudo-hypertrophy of the muscles, etc. In all these affections the pathological condition is hyperplasia of interstitial tissue, attributed to chronic inflammation, and it would be an improvement in nomenclature to apply the term sclerosis to this condition wherever situated—a term which expresses the most marked physical change, without involving any hypothesis as regards the morbid processes.

The etiology of this affection has an important bearing on the diagnosis. It is an effect of the abuse of alcoholics in the vast majority of cases. The manner of the abuse is to be considered with reference to the diagnosis and the treatment. Generally patients with this affection have been accustomed for a long period to take some form or forms of spirit before breakfast and at other periods of the day when the stomach is empty. It may be produced, although very rarely, by the use of wine or malt liquors. The affection constitutes more than presumptive evidence, and almost positive proof, of the habit of spirit drinking.

The development of the affection is slow and insidious. Prior to the occurrence of characteristic symptoms, probably in most cases the liver is more or less enlarged. When, however, certain symptomatic effects are manifested, the liver is generally diminished in volume. Exceptional cases are those in which, in connection with the cirrhosis, the liver is enlarged by fatty deposit, or there is coexisting waxy degeneration.

Atrophy of the liver and a nodulated surface, when the latter can be ascertained by palpation, are important diagnostic points.

The symptomatic effect which especially characterizes the affection is hydroperitoneum. In the great majority of the cases of peritoneal dropsy, when local, that is, not a component of general dropsy, it depends on cirrhosis of the liver. The cirrhosis has existed for a considerable period before this effect follows, but, prior to its occurrence, the diagnosis can rarely be made with certainty. Gastro-intestinal disorders—impaired appetite and digestion, diarrhœa in some cases, uneasiness or dull pain in the right hypochondrium—deeply colored urine with an abundant deposit of the urates, loss in weight, general debility, and sometimes jaundice, the patient having been for a long time addicted to the use of spirits, point to the existence of the affection; but all these symptoms may exist without interstitial hepatitis. The diagnosis is positive, if, under these circumstances, hydroperitoneum occurs, and diminished volume of the liver be determined. Without the latter point, and even if the liver be enlarged, there is not much room for doubt in respect of the diagnosis. But hydroperitoneum dependent on cirrhosis not infrequently occurs without the foregoing symptoms either preceding or accompanying the dropsy. In many cases the dropsy is the first event which denotes the existence of any important disease; the hepatitis is latent until this effect has been produced. If tapping be resorted to, the flaccidity of the abdominal walls directly after the operation, may enable the fingers to be passed under the ribs so that the liver may be felt, the abnormal hardness and roughened surface, which are characteristic of the affection, being ascertained.

Another symptomatic effect is hemorrhage from either the stomach or intestinal canal. This effect may take place without being accompanied or immediately followed by peritoneal dropsy. The hemorrhage in some cases is protective against dropsy. Persistent serous or watery diarrhœa is a symptomatic effect in some cases, and may be in like manner protective.

These symptomatic effects, it is to be borne in mind, are not pathognomonic. Both dropsy and hemorrhage may be caused by atrophy of the liver due to the external compression incident to peritoneal adhesions over the organ, by thrombosis of the vena portæ, and pressure upon the portal vein by an abdominal tumor. The youth of the patient and the fact of total abstinence from alcoholics, are especially important in excluding cirrhosis. To these negative points is to be added a rapid increase of the dropsy.

A diagnostic sign which is sometimes conspicuous, is enlargement of the superficial abdominal veins, especially on the right side. These become enlarged in consequence of a reversed current of blood from the portal into the general venous system, through vessels anastomosing with the epigastric and internal mammary veins. The superficial veins of the abdomen are in some cases greatly enlarged, their size exceeding considerably that of a crow's quill. The portal obstruction, which stands in a causative relation to hydroperitoneum and hemorrhage, is relieved by this diversion of blood, and the latter is thus more or less protective as regards these symptomatic effects.

The spleen is often, but not invariably, enlarged. Jaundice is an occasional, not a frequent, effect.

Treatment of Chronic Interstitial Hepatitis.

Peritoneal dropsy and gastric or intestinal hemorrhage, occurring in this pathological connection, involve important therapeutic indications. These secondary affections have been considered with reference both to diagnosis and treatment (*vide* pages 301, and 252, 257). The hemorrhage may be so profuse as to cause sudden death from the loss of blood. Instances have fallen under the author's observation. The extent, however, to which large, repeated hemorrhages are borne, in some instances, and the recuperation therefrom, are surprising. As regards the dropsy, it is of great importance to remove the liquid by tapping as soon as the patient suffers from distension, provided other measures (diuretics and hydragogues) do not prove successful. The persistence of the dropsy interferes with alimentary support; and this is essential in order to render the patient tolerant of the hepatic disease. The indication for the removal of the dropsy as quickly as possible, exists whenever the liquid reaccumulates sufficiently to occasion injurious pressure upon the digestive organs.

The removal of the structural change which has taken place in the liver cannot be effected. It is useless to give remedies for this purpose. The objects of treatment are prevention of further progress of the disease and tolerance. With reference to the first of these objects, the use of spirits is to be interdicted. If the condition appear to indicate alcoholics, or if the patient will not consent to discontinue their use, they should consist of wine or malt liquors, and these should be taken only with the ingestion, or during the digestion, of food. The propriety of this course is evident when it is considered that the presence of alcohol in the portal blood is the direct cause of the hepatitis.

Tolerance is promoted, as in other incurable diseases, by alimentation as abundant as the digestive powers will admit of, together with remedies to improve appetite and digestion, if these be defective, and invigorating hygienic measures.

Although the disease ends fatally sooner or later, a fair condition of health is sometimes regained even after profuse hemorrhages have taken place, and the recurrence of dropsy requiring the operation of tapping many times. Coexisting diseases and the general effects of alcoholism often stand in the way of securing tolerance. When death is produced by the disease *per se*, it is preceded generally by progressive emaciation, debility, and notable anæmia, the mode of dying being by asthenia, and the intellectual faculties remaining intact until near the close of life. In a small proportion of cases, a fatal termination is preceded by coma and perhaps convulsions, attributable to suppression of the excretory function of the liver, and consequent acholia or cholesteræmia.

SYPHILITIC HEPATITIS.

Embracing under this name the variety called cortical hepatitis, so called because the disease generally commences at the periphery of the liver and extends thence inwardly, and also the variety characterized by the development of what are known as gummy tumors, the disease simulates in certain respects the much more frequent form just considered. Peritoneal dropsy and gastric or intestinal hemorrhage are less frequent. Jaundice occurs in a larger proportion of cases. It is apt to persist, but is rarely intense. Pain over the liver occurs oftener and is more marked, probably because perihepatitis is more constant. In addition to these differential points, the diagnosis involves knowledge of the fact that the disease follows syphilis, as determined by the confession of the patient, and the traces of that disease elsewhere. If the patient have not been a spirit drinker, this fact bears strongly on the diagnosis. Moreover, the patient may be under that period of life when ordinary interstitial hepatitis generally occurs, the latter being rare prior to middle age. The syphilitic affections are sometimes congenital.

In addition to symptomatic indications, antisyphilitic remedies are to be employed, namely, the iodides and mercury.

STRUCTURAL DISEASES OF THE LIVER.

THE FATTY LIVER, THE WAXY, LARDACEOUS OR AMYLOID DEGENERATION, CANCER AND HYDATID CYSTS.

In addition to the above list of structural diseases, other affections belonging in this group are of interest as entering into the study of morbid anatomy and pathology, but, with our present knowledge, they are of little practical importance in respect of diagnosis and treatment. Among the latter are, simple hypertrophy which is incident to hepatic congestion, saccharine diabetes, leucocythemia, and malarial cachexia; pigmentation, representing melanæmia; adenoid and erectile tumors; tubercles, and multiple cysts.

FATTY LIVER.

If the liver be enlarged sufficiently to render it accessible to palpation below the ribs, its fatty condition is determined by the absence of nodosities upon its surface, softness as shown by its offering less resistance than other forms of enlargement, by the lower edge being thick or blunted, and by the preservation of its normal symmetry. The liver, however, when there is an abnormal accumulation of fat within the hepatic cells, is not always enlarged. The fatty condition cannot then be ascertained. There is no reliable evidence of its existence aside from that obtained by the touch. Moreover, an abnormal accumulation of fat often accompanies other changes, for examples, cirrhosis and waxy degeneration. A fatty liver does not give rise to the symptomatic effects which characterize the latter affections. If, therefore, in cases of enlargement with the physical signs which denote that the organ is fatty, there occur either hydro-peritoneum, hemorrhage from the alimentary canal, or enlargement of the spleen, the inference is that cirrhosis coexists. The same inference is to be drawn in regard to waxy degeneration if symptoms be present denoting this affection.

Fatty liver, existing in a sufficient degree to be recognized by physical signs, is very rarely a primary or isolated affection. It is secondary especially to phthisis. It is associated not only with other hepatic affections than those just mentioned, but with numerous general and local diseases. It is one of the effects of alcoholism. It is caused by arsenic, antimony, and phosphorus in toxical doses. In the rare instances in which it is to be regarded as an idiopathic affection, it is generally attributable to the over-ingestion of aliment, particularly of articles of diet abounding in fat, conjoined with habits of indolent inactivity, and especially when these causes are operative in a tropical climate.

It is chiefly as an effect of the causes last named, and the abuse of alcohol, that it claims measures of treatment addressed directly to the affection. The indications for treatment are derived from the etiology, and the measures are hygienic rather than medicinal. Alcoholics are to be either interdicted or they are to be taken with great moderation. The diet should consist of animal food, together with articles containing a moderate proportion of fatty, starchy, and saccharine principles. Muscular exercise taken, if practicable, in the open air, constitutes an important part of the treatment.

Its pathological importance when secondary to, or associated with, other affections, is not well ascertained.

WAXY, LARDACEOUS, OR AMYLOID DEGENERATION.

The diagnosis of this affection, like that of fatty liver, can only be made, with any degree of positiveness, when it has produced enlargement sufficient for physical exploration by palpation. The liver is enlarged symmetrically; it offers a greater resistance to pressure than the fatty liver, and the lower extremity of the organ is less rounded or blunt. The surface is smooth. These distinctive characters are present when the enlargement is due wholly or chiefly to this affection. As already stated, it may be associated with an abnormal accumulation of fat. The characters just named serve to distinguish the affection from the fatty liver; but they do not distinguish it from enlargement caused by simple hypertrophy or congestion. The diagnosis must rest, in a great measure, upon etiological facts, and evidence of the disease in other situations, namely, the spleen, the kidneys, and the alimentary canal. If, with an enlarged liver, symptoms show renal disease; if the spleen be enlarged, or a persistent, uncontrollable diarrhœa denote a grave intestinal affection, the diagnosis is extremely probable. Again, if the enlargement of the liver have been preceded by disease of the bones, prolonged suppuration, the malarial cachexy, or syphilis, it is probably due to waxy degeneration. Peritoneal dropsy and jaundice very rarely accompany the disease, and pain referable to the liver is wanting, provided there exist no other hepatic affection.

Treatment of Waxy Liver.

The morbid conditions which are causative of the affection, namely, syphilis, suppuration, disease of the bones, and the malarial cachexy, call for appropriate measures of treatment. If waxy kidneys coexist, the effects of this affection—general dropsy and uræmic manifestations—furnish important indications. Measures to promote appetite and digestion are indicated. The alimentation should be as substantial as the digestive powers will admit of. Invigorating hygienic influences should be brought to bear as far as possible. Jules Simon extols the efficacy of sea-bathing and residence on the sea-coast for several months or years as highly efficacious, especially in childhood.[1] Of remedies which are supposed to have a special influence, the iodide of potassium, the solution or tincture of iodine, the iodide of iron, and the muriate or carbonate of ammonia, are to be mentioned as most likely to be useful.

The prognosis is always extremely unfavorable. If the causative conditions continue in operation, or if either the kidneys or the alimentary canal be affected, a fatal result is inevitable.

CANCER OF THE LIVER.

Cancer of the liver may exist with little or no enlargement of the organ, but, as a rule, the organ is more or less enlarged, and not infrequently it is greatly increased in size; it sometimes occupies the larger part of the abdominal space. A positive diagnosis, as in cases of fatty and waxy liver, requires the physical signs obtained by palpation, and, therefore, cannot be made unless there be enlargement. Symptoms are usually present which are important in the differentiation from other affections which cause enlargement. Cancer rarely occurs under the age of forty, and this fact is to be considered in the diagnosis. Moreover, in a large majority of cases, cancer of the liver is secondary to the disease in some other situation. This fact may render the diagnosis highly probable from symptoms alone, when the organ is not enlarged sufficiently for manual examination.

The chief physical evidence of cancerous enlargement is an irregular, nodulated surface; tuberosities may project above the surface of the organ so as to be felt as tumors, and in some cases they form outgrowths, either from the surface or the extremity, which may attain to the size of an orange. The enlargement is not symmetrical, that is, the organ is deformed by the cancerous growths or infiltrations being either limited to a part, or affecting some parts more than others. The nodules or tumors give to the touch a sensation of hardness or softness, according as the cancerous affection is of the scirrhus or medullary variety. The feeling is sometimes that of fluctuation.

Tenderness on pressure and pain are nearly constant symptoms. In this respect cancer offers a marked contrast to the waxy and fatty liver, and a resemblance to syphilitic hepatitis. The pain, in some instances, is intense, lancinating in character, and shooting in different directions, in these regards differing from the syphilitic affection. Jaundice occurs in a certain proportion of cases, and persists to the fatal termination. Peritoneal dropsy sometimes occurs, but the quantity of liquid effusion is seldom large. The effusion depends, in some instances, on coexisting subacute peritonitis.

---

[1] *Vide* Nouveau Dictionnaire de Médecine et de Chirurgie, art. Foie.

The general symptoms have considerable diagnostic significance. These are, progressive emaciation and anæmia, the face in some cases, not invariably, having the straw-colored complexion which is strongly indicative of cancerous disease. The emaciation and anæmia are explained, in a great measure, by the anorexia and defective digestion which enter into the clinical history of the affection. Unless there be an inflammatory complication, the body heat is not raised.

Cirrhosis of the liver can hardly be confounded with cancer, save in the cases in which, exceptionally, the liver in the former affection is enlarged. It is excluded by the pain and tenderness; by either the absence or the small amount of hydroperitoneum, and by the fact, in certain cases, that the patients are not spirit drinkers. In the progress of the disease, an enlarged cirrhotic liver may be found to diminish, whereas, a cancerous liver continues to increase in size.

The duration of cancer of the liver is to be taken into account. The disease usually terminates fatally within six months. It very rarely exceeds a year. In a doubtful case, the duration beyond six months, therefore, is a point in evidence against the disease, and its existence is extremely improbable if more than a year have elapsed.

In general, cancer in this situation is diagnosticated without difficulty; but there are cases in which it may exist and prove fatal, not only without sufficient enlargement for the diagnostic local signs to be available, but when it is completely latent as regards pain and tenderness. It is liable to be overlooked, or it may not be discoverable, when it is secondary to cancer of stomach or some other of the abdominal viscera.

Treatment of Cancer of the Liver.

As this disease is invariably fatal, the practitioner must be content with following symptomatic indications. Pain and soreness are to be palliated. If moderate in degree, these symptoms may be relieved by belladonna, hyoscyamus, or conium, with anodyne applications over the liver. In many cases, however, opium is required to relieve the suffering. Peritoneal effusion, if sufficient to occasion inconvenience, should be removed by puncture, avoiding the perturbation and debility caused by hydragogue cathartics and diuretics. Tolerance is to be promoted by tonic remedies, and an alimentation as nutritious as practicable.

There are no remedies at present known to possess the power of arresting or retarding the progress of the cancerous disease.

HYDATID TUMOR OF THE LIVER.

Hydatid disease is extremely rare in this country. Prof. Janeway who, as one of the curators of Bellevue Hospital, has had for the past ten years a very large field of autopsical observation, states that he has only met with it in three instances, and in none of these were the hydatid sacs large enough to do any injury. Two were found in livers which had been the seat of lacerations from injury.[1]

---

[1] *Vide* Series of Clinical Lectures, edited by E. C. Seguin, M.D., volume iii. No. v. 1877.

The disease gives rise to no symptoms until it forms a projecting tumor of greater or less size. The tumor may project from any one of the different aspects of the liver. It may attain to a very large size, filling the greater part of the abdominal or thoracic space in some instances; not infrequently it has reached a considerable size before giving any intimation of its existence.

The physical characters of an hydatid tumor are as follows: Its surface is smooth. It is elastic to the touch, and, if near the surface, it may give a sense of fluctuation. A distinctive sign is a thrill or fremitus when percussion is made upon the fingers placed over the tumor. This is known as the "hydatid vibration." It is, however, not always obtained. A well defined tumor connected with the liver, and presenting these signs, unattended by pain or any local symptoms save those dependent on its pressure upon adjacent parts, without fever or other evidence of constitutional disturbance, of slow growth and long duration, can hardly be confounded with any other affection.

The affections to be excluded will depend on the direction which the tumor takes. If it project into the thoracic space, it may simulate pleuritic effusion or empyema. These affections are excluded by the fact that the upper limit of the flatness caused by the tumor is not a horizontal line, the patient either sitting or standing, and this line does not vary with the position of the body. These differential points, however, are not available if pleuritic effusion should happen to coexist.

The tumor may occupy so large a portion of the abdominal space that hydroperitoneum is to be excluded. The unequal enlargement of the abdomen, and the fact that it enlarges from above downward, suffice for this differential diagnosis which, however, is not easy if peritoneal dropsy coexist. The association of the two affections is rare.

A distended gall-bladder is excluded by the absence of its diagnostic features, namely, the situation and the form of the tumor, together with the absence of jaundice.

Abdominal aneurism is excluded by the absence of lateral pulsation, and of the pain which is characteristic of that affection.

Cancerous disease of the kidney, or in other situations, as well as in the liver itself, is accompanied by pain and by constitutional symptoms, the absence of which suffices for its exclusion.

An abscess of the liver so situated as to offer to the touch a sense of fluctuation, is accompanied by local and general symptoms which are wanting in hydatid disease, and the progress of the affection is more rapid. Suppuration, however, sometimes takes place within a hydatid sac, and it is then converted into an abscess.

A demonstrative diagnosis is obtained by means of an exploratory puncture. Quoting from Murchison, "the fluid which escapes from an hydatid, even if it contains no echinococcus or shreds of striated hydatid membrane, will reveal its nature with absolute certainty. If the sac be not inflamed, it is limpid, when running in a stream, with a slight opalescence when viewed in bulk; it is alkaline, and has a specific gravity of 1007 or 1000; it contains neither albumen nor urea, but throws down a copious white precipitate with nitrate of silver owing to its strong impregnation with common salt. These characters apply to no other fluid in the body whether healthy or morbid. Even if the case should turn out to be an aneurism or a cancer, no harm is likely to result from an exploratory puncture."[1]

Treatment of Hydatid Tumor.

The importance of treating promptly and successfully an hydatid tumor, is to be estimated by the following considerations: *First*, its liability to burst, the contents being discharged in situations where they give rise to serious or fatal disease. These situations are, the pleural cavity or the bronchial tubes, the latter, of course, being less serious than the former; the peritoneal cavity, causing fatal peritonitis; the pericardial sac, producing death either immediately or within a few hours; the biliary passages, generally ending in death, and the inferior vena cava, life being quickly destroyed by embolism of the pulmonary artery. The most favorable situations are externally through either an intercostal space or the abdominal wall; but the discharge is least frequent in these situations. *Second*, the liability to suppuration within the hydatid sac. *Third*, the danger incident to pressure when the tumor becomes very large, although rupture may not take place. *Fourth*, the small probability of a cure taking place spontaneously. The latter sometimes occurs, shrivelling and disappearance of the tumor following the death of the parasites; but the instances are extremely rare.

For success in treatment, the vitality of the echinococci and of the mother cyst must be destroyed. Internal remedies cannot be relied upon for this object. The electrical current transmitted through needles introduced into the sac, has been found successful. A simpler and more effective method, however, is the removal of the liquid by aspiration. This method, moreover, has the great advantage of affording, without any delay, protection against the liability to rupture. The withdrawal of the liquid is found to destroy the parasites. No preparatory measures are needed to prevent the escape of the liquid into the peritoneal cavity through the orifice made by the aspirating needle or canula. The point selected for the puncture should be that in which the fluid is nearest the surface.

If suppuration take place within the hydatid sac, a free opening should be made, and the treatment is the same in all respects as in cases of hepatic abscess.

The disease is so rare in this country that there is hardly occasion for considering the prophylaxis. Preventive measures in some countries are extremely important, especially in Iceland where it is the cause of one seventh of the mortality. The prophylaxis consists in preventing the entrance into the body of the ova of the tænia echinococcus. This variety of tape-worm is found in the intestines of the dog. The hydatids from these ova are developed in animals slaughtered for food, especially the sheep. The raw meat thus infected, if eaten by dogs, leads to the development of tape-worms. The fact that in Iceland dogs occupy often human habitations, and are much of the time within doors, participating in the close quarters of their masters, in the poorer classes, accounts for the prevalence of the disease in that country.

---

[1] Diseases of the Liver, Am. edition, 1868.

FUNCTIONAL DISEASES OF THE LIVER.

CONGESTION, DISORDERS OF THE SECRETORY AND THE EXCRETORY FUNCTION. HEPATALGIA.

Affections of the liver which are purely functional, that is, occurring independently of either inflammation or structural changes, relate to the circulation within the organ, and to its secretory or excretory products. Neuralgic pain referable to the organ (hepatalgia), is also recognized as a functional affection.

Congestion of the Liver.

Congestion (hyperæmia), is a consequence of a mechanical obstacle affecting the general venous system. It is an effect of dilatation of, and an over-accumulation of blood in, the right auricle, arising generally from either mitral lesions, emphysema of the lungs or tricuspid regurgitation. The causative cardiac conditions are sometimes produced by tumors pressing on the inferior vena cava. The hepatic congestion is sometimes sufficient to cause more or less enlargement of the liver. The degree of enlargement varies at different times. It is symmetrical, and the surface of the organ is smooth. With these physical characters, if the enlargement occur in cases of the cardiac affections just named, it is attributable to congestion. Other organs are also congested, and, if the obstacle be considerable, the prolabia and face will show cyanosis. An appreciable impulse is sometimes communicated to the liver, by the systole of the right ventricle, in cases of tricuspid regurgitation.

The treatment is to be addressed to the cardiac conditions on which the congestion depends.

Congestion due to an obstacle to the systemic venous circulation is purely mechanical (passive hyperæmia). Congestion from an abnormal determination of blood to the liver (active hyperæmia), doubtless occurs without reaching that degree which characterizes the commencement of inflammation. Symptoms supposed to denote the latter are a sense of weight, distension or indefinite uneasiness in the right hypochondrium, extending sometimes to the right shoulder, and especially if jaundice be associated therewith. The condition is attributed to the abuse of alcohol, excesses in diet, the immoderate use of spices, malaria, and conjoined with these causes, the influence of a tropical climate. The dietetic causes act primarily upon the stomach and duodenum; hence the foregoing symptoms may be referable to these parts, rather than to the liver. At all events, gastro-duodenal congestion and irritation, the latter extending into the ductus communis, probably coexists and stands in a causative relation to an undue determination of blood to the liver. If these views be correct, the diagnosis of hepatic congestion, as a distinct affection, cannot be made with any approach to certainty.

The condition which is the opposite of congestion, namely, an abnormal deficiency of blood (local anæmia or ischæmia), doubtless occurs, but there are no grounds for its recognition as a distinct functional affection.

DISORDERS OF THE SECRETORY AND THE EXCRETORY FUNCTION OF THE LIVER.

Assuming that the bile is an important factor in digestion within the intestinal canal, and that it is also in part an excrementitious product, our actual knowledge of functional disorders affecting it either quantitatively or qualitatively in these two aspects is extremely small. This statement is not in accordance with popular ideas. Patients complain of being bilious, meaning thereby a redundancy of bile, and of a torpid liver, as if these were well-established and easily recognized morbid conditions. There are no means of determining that the biliary secretion is excessive. Its ejection by vomiting shows only that it regurgitates into the stomach, not that the quantity secreted is too large. Its appearance in the dejections may be due to a deficient absorption from the alimentary canal, the secretion not being greater than normal. A deficiency of bile within the intestinal canal is to be inferred from the absence of the characteristic coloration and the abundance of fat in the dejections. This deficiency is fairly attributable to defective secretion, provided there be no obstruction of the biliary passages. A marked effect of opium is apparently a diminished secretion of bile, and, judging from the appearances of the dejections, this is not infrequent as a purely functional disorder. Its pathological importance, however, is not well ascertained. It is highly probable that cephalalgia and other symptoms referable to the nervous system are caused by retention in the blood of the excrementitious portion of the bile. These symptoms are relieved by cathartics, and especially those which are supposed to act specially upon the liver.

The popular use of the terms "biliousness," "torpid liver," and "liver complaint" originated when physicians were accustomed to consider, far more than at the present time, morbid conditions relating to the bile as the source of many disorders, and as giving rise to important modifications of different diseases. Patients generally are well satisfied if their maladies be referred to the liver, and this is perhaps sometimes a reason for attributing to this organ an agency in ailments, the true pathological character of which is not apparent.

HEPATALGIA.

A neuralgic affection of the liver, of course, is characterized by pain referable to the organ. Pain, however, is a symptom of various other hepatic affections. In diagnosticating hepatalgia, these are to be excluded. Gastralgia, pleurodynia, intercostal neuralgia, the passage of gall-stones, pleurisy, renal and intestinal colic are also to be excluded. Considering the extreme infrequency of the affection, and the difficulty of excluding all other affections, the chances of an error in diagnosis are not few.

The treatment of hepatalgia is the same as in other neuralgic affections.

DISEASES OF THE BILIARY PASSAGES.

OBSTRUCTION OF THE BILE DUCTS, GIVING RISE TO JAUNDICE. THE PASSAGE OF GALL-STONES, OR HEPATIC COLIC. DISEASES OF THE GALL-BLADDER.

Obstruction of the Bile Ducts. Jaundice.

Important points of clinical inquiry, in addition to the existence of obstruction, are its situation, its degree, and its causes, in individual cases.

Obstruction of ducts within the liver is liable to occur in connection with cancer, syphilitic hepatitis, cirrhosis, and abscess. This accounts for the jaundice in a certain proportion of the cases of these diseases. Obstruction of these ducts may also be caused by biliary calculi, lumbricoid worms which have migrated from the intestinal canal, the presence of the liver-fluke (distoma hepaticum), and hydatids. The four last-named obstructive affections cannot be diagnosticated.

An obstruction of the cystic duct does not occasion jaundice. The limitation to this situation may be inferred when distension of the gall-bladder is ascertained, and jaundice is absent. The obstruction is most likely to be caused by an impacted gall-stone. An inference that this may be the cause, is to be based on the occurrence of pain having the diagnostic characters of hepatic colic. Distension of the gall-bladder, however, is by no means constant in cases of obstruction of the cystic duct; the distension, under these circumstances, is the effect of an accumulation, not of bile, but of either serous transudation or inflammatory products. If the gall-bladder be not distended, obstruction in this situation is beyond the reach of diagnosis.

Obstruction may be limited to the hepatic duct, that is, situated between the liver and the ductus communis. This may be caused by a calculus, the formation of which has taken place within the liver. The pain of hepatic colic and jaundice may be produced by a calculus in this situation. Distension of the gall-bladder from an accumulation of bile does not occur. Calculi, however, are very rarely formed within the liver, and it would denote great rashness to venture upon a diagnosis of obstruction thus limited.

In the majority of cases, obstruction giving rise to jaundice is situated in the common duct. The obstructing conditions are various, but they may be arranged into those which act either within the duct or at its duodenal opening, and those which act by pressure from without the duct. The causes embraced in the first class are inflammation of the duodenum extending into the duct, gall-stones, foreign bodies derived from the intestinal canal, lumbricoid worms, cicatrized ulcers, and morbid growths. The causes in the second class are tumors connected with either the liver, kidney, pancreas, or omentum; enlarged glands in the fissure of the liver, aneurism of the abdominal aorta, fecal collections in the colon, the uterus enlarged by pregnancy or intra-uterine growths, and ovarian disease.

The degree of obstruction produced by either of these manifold causes is to be judged of by the intensity of the jaundice and the color of the dejections. The dejections, if white or ash-colored, denote absence of bile in the intestinal canal. The inference is, that the obstruction is complete. Slight or moderate coloration by bile pigment, on the other hand, shows the obstruction to be incomplete. A judgment may be formed of the degree of incomplete obstruction by the habitual amount of coloration of the feces. Great intensity of jaundice is evidence of considerable or complete obstruction. The jaundice, however, may decrease much in consequence of diminution in the secretion of bile, while the obstruction continues undiminished; hence, it is not always to be inferred that there is any real improvement from the fact that the jaundice has become less marked. On the other hand, it is to be borne in mind that the jaundice continues for some time after all obstruction has ceased, the explanation being that the pigment in the tissues is not at once removed after the bile no longer enters the hepatic veins. The quantity of bile in the urine is the best criterion for determining whether it continues to be absorbed from within the liver; it disappears from the urine, or is reduced to a minute quantity, for some time before the coloration is removed from the tissues.

Obstruction of the hepatic or common duct, unless slight or transient, gives rise to jaundice, but it is generally considered that jaundice may occur without obstruction. The jaundice which occurs in yellow fever, relapsing fever, typhus and typhoid fever, in the malarial fever of certain tropical climates, pyæmia, poisoning by venomous snakes, and by phosphorus, is supposed not to be caused by obstruction. To this list is to be added the jaundice occasionally produced by violent mental emotions. Assuming that in these instances there is no obstruction, questions arise in relation to the pathological explanation of the jaundice, the discussion of which does not belong to this treatise. Suffice it to say, these instances are to be excluded in proceeding to notice diagnostic points involved in the differentiation of the various conditions which are causative of obstruction and jaundice. Jaundice due to local obstructive causes is distinguished as hepatogenous jaundice. When not thus produced, it is called by some writers hæmatogenous jaundice, the latter name implying that the formation of the pigment takes place in the blood.

Of the different causes of jaundice from obstruction, the most frequent is duodenal inflammation either extending into the common duct or producing obstruction from swelling of the membrane at the opening of the duct within the duodenum (catarrhal jaundice). The jaundice, when thus produced, is preceded for several days by symptoms denoting gastro-duodenitis, namely, loss of appetite, nausea or vomiting, tenderness over the epigastrium, and some febrile movement. The diagnosis, as regards the causation, hinges on these prodromic symptoms. As in all instances in which the common duct is obstructed, the liver may become moderately enlarged, and the gall bladder is sometimes distended by the accumulation of bile so as to be discovered by the touch. The diagnosis is corroborated by the disappearance of the jaundice, together with the reappearance of bile in the dejections, following recovery from the gastro-duodenal inflammation. If the jaundice persist, and become chronic, the inflammation within the duct continues, or it has left changes which involve obstruction.

Next in frequency to the foregoing causes of obstruction, is the presence of a gall-stone. This cause is to be inferred from the occurrence of jaundice when preceded or accompanied by the diagnostic symptoms of hepatic colic, an affection to be presently considered. In some instances a gall-stone may occasion obstruction and jaundice without giving rise to these symptoms. If the gall-stone pass into the duodenum, the jaundice disappears, unless the passage of the stone have occasioned inflammation or ulceration within the duct. The cicatrix of an ulcer may produce permanent obstruction. The symptoms of hepatic colic may disappear, the stone remaining impacted in the duct. An instance has recently fallen under the author's observation, the patient dying from thrombosis of the portal vein, with multiple abscesses of the liver, and peritonitis. The common duct was found to be occluded by a gall-stone which for several days before death had given rise to no pain.

In the rare instances in which the duct is obstructed by foreign bodies from the duodenum, or lumbricoid worms, the jaundice occurring without symptoms of gastro-duodenal inflammation, and accompanied by the symptoms of gall-stones, the presence of the latter is the most rational supposition on account of its vastly greater frequency. This error in diagnosis cannot be avoided.

Obstruction caused by an ulcer near the opening of the common duct might be surmised, if, preceding the evidence of the obstruction, the diagnosis of duodenal ulceration had been made out; otherwise the recognition of this cause is impossible.

Obstruction caused by pressure from without the duct has generally this point of distinction, namely, the jaundice from the obstruction, at first slight, increases slowly; whereas, when the obstruction is from causes within the duct, the jaundice, as a rule, quickly reaches its maximum, afterward diminishing in consequence of either the obstruction becoming less, or the secretion of bile decreasing.

The various causes belonging to this class are to be determined in individual cases by the diagnostic characters which belong to them severally, irrespective of the evidence of obstruction. Certain of these are recognized without great difficulty, namely, aneurism of the aorta, fecal collections, pregnancy, intra-uterine growths, and ovarian disease. Others, namely, tumors connected with the liver, kidney, pancreas or omentum, are not as easily discriminated. The differential characters of these different affections need not here be considered.

The pressure of a tumor from without may cause not only jaundice, but peritoneal dropsy, the pressure affecting the vena portæ as well as the common duct. The coexistence of jaundice and dropsy, therefore, is evidence of an outward pressure, provided disease of the liver be excluded, inasmuch as obstruction from causes within the duct gives rise to jaundice without obstructing the portal vein. This fact may serve to diagnosticate the existence of outward pressure, when a tumor cannot be ascertained by palpation—for example, when the pressure is caused by enlarged glands in the fissure of the liver.

Treatment of Obstruction of the Bile Ducts and Jaundice.

The treatment of obstruction and jaundice incident to gastro-duodenitis, resolves itself into that indicated by the latter affection. Active cathartics or emetics are of no avail in overcoming the obstruction, and are likely to increase the inflammation. A blister over the epigastrium is often useful.

The measures of treatment when the obstruction is caused by gall-stones, are those which promote the passage of the latter into the duodenum.

In like manner obstruction by pressure from without, can only be relieved by measures addressed to the different affections which produce the pressure. It is obvious that certain of these affections tend to increase rather than to decrease, and cannot be reached by therapeutical measures. In all cases, if a distended gall-bladder can be felt, pressure may be made upon it, and the obstruction, if removable, is sometimes by this method removed. Emptying the gall-bladder in this way has been practicable in a few cases under the author's observation.

It is an object to diminish the accumulation of bile in the blood by increasing elimination by the kidneys if the quantity of urine be deficient. Aside from this object and measures having reference to the causes, the symptomatic indications in each case are to govern the treatment. Pruritus of the skin is in some cases a most distressing and obstinate symptom. The various anti-pruritic applications should be tried in succession, namely, washes containing opium, bicarbonate of soda, biborate of soda, dilute prussic acid and camphor, glycerine, vaseline, etc. Murchison recommends the use of the bicarbonate of potassa internally. In a case observed by the author, the application of water as hot as could be borne, afforded the most relief.

Jaundice, if the obstruction be not complete, may be tolerated for a long period. The author has met with instances in which it has persisted for from two to three years, recovery finally taking place. In one case it existed for eight years, the patient having had tolerable health until a few months before death.

THE PASSAGE OF GALL-STONES.

This extremely painful affection occurs rarely before middle life, and more frequently in women than in men. It is characterized by pain often most agonizing and subduing, which continues generally until the gall-stone has either passed into the duodenum, or has receded into the gall-bladder. In some cases the gall-stone becomes impacted in the duct, and the characteristic pain of hepatic colic may then cease, leaving an aching pain which is more or less intense. The pain which characterizes hepatic colic has its seat or point of departure in the neighborhood of the biliary passages, shooting thence in different directions. Its duration varies from a few moments to several days. Notable exacerbations occur if the paroxysm be of long duration. Copious perspiration is apt to accompany severe pain. The surface of the body is cool or cold. The body heat is not raised. The frequency of the pulse is not increased, except as a consequence of the writhing movements which the pain occasions. In some cases the frequency is less than in health. Vomiting is rarely wanting, and it is sometimes a prominent symptom. Chills or chilly sensations are common. The attack of pain is apt to follow the ingestion of a full meal. It is apparently sometimes brought on by violent muscular exertions, as in the instance of a medical friend of the author by a very rough horseback ride. The paroxysm ends suddenly. The ending denotes that the stone has passed into the duodenum or backward into the gall-bladder. The duration of the paroxysm depends on the time occupied by the passage of the calculus in these two directions.

A patient may have but a single paroxysm. In most cases, however, paroxysms recur after intervals which have no regularity. Paroxysms sometimes recur several times during a single day; they may recur on successive days, or repeatedly within a few days. On the other hand, they recur after the lapse of weeks, months, or years.

If the hepatic colic continue for one or two days, or if repeated attacks follow in quick succession, jaundice is caused by obstruction from the gall-stone, or by inflammation within the common duct. This symptom is wanting when the gall-stone does not pass beyond the cystic duct; when the passage through the common duct occupies but a few hours; and when several stones pass within a short period without exciting in their passage inflammation. The latter effect is the cause of the persistence of the jaundice in some cases after the calculus has passed into the duodenum. The obstruction may give rise to the presence of bile in the urine, when the conjunctiva and skin do not show a yellow coloration.

The symptoms in the foregoing synopsis which have a positive significance in the diagnosis, are, the sudden occurrence and rapid increase of the pain, its character and localization; the occurrence of vomiting; jaundice or the presence of bile in the urine; the infrequency of the pulse, and the abrupt cessation of pain. To these may be added distension of the gall-bladder, so that it may be appreciable by the touch. The clinical history thus contains diagnostic points which, if distinctly present, render the affection easily recognizable. But all these points are not available in every case, and hence, here, as in many instances, the discrimination from other affections which give rise to intense pain, is not always as easy as it may seem to be from the description given in books and the lecture-room. It is important, therefore, to take into view the affections which are to be excluded. These are chiefly peritonitis, intestinal obstruction with symptoms of strangulation, gastralgia, and gastro-enteralgia, the latter including lead colic.

Acute peritonitis is excluded without much difficulty. The absence of a febrile temperature, which in hepatic colic is the rule with rare exceptions; of notable acceleration of the pulse; of pain and tenderness diffused over the abdomen; of rigidity of the abdominal muscles, and of great muscular prostration, suffice to show that the patient is not affected with that disease.

In cases of intestinal obstruction with symptoms of strangulation, the pain is developed more slowly; its localization at first is not likely to be in the site of the biliary passages; the symptoms of peritonitis are present when it becomes severe; the abdomen is distended above the poin of the obstruction, and the fact of intestinal obstruction is soon ascertained.

Gastralgia and gastro-enteralgia, more than the foregoing affections, present symptoms in common with hepatic colic. The pain may be equally intense. It is more diffused than in hepatic colic. The exacerbations are more marked. Vomiting is less frequent as a symptom. A capital point of distinction relates to the effect of opiates; these afford, within a short period, complete relief if the affection be purely neuralgic, whereas, they only mitigate the suffering during the paroxysm of hepatic colic.

The pain in lead colic is rarely as intense as in severe paroxysms of hepatic colic. Its situation is different; moreover, other effects of lead are likely to be present, including the blue line upon the gums; the occupation of the patient is generally known to involve a liability to become poisoned by this metal, and often this or some other affection attributable thereto has previously occurred.

In many cases the fact that previous attacks of hepatic colic have been experienced is well known, and this fact is to be considered in the diagnosis.

The proof of the correctness of the diagnosis is obtained by finding the stone or stones in the dejections. Without a proper method of examination they are likely to be undiscovered. The feces should be diluted and passed through a wire sieve. This should be continued for several days after an attack. Gall-stones are not always found when the diagnostic points render it quite certain that an attack has occurred. There are several reasons for failure to obtain this demonstrative proof. One reason is that the stones are sometimes readily disintegrated, and they in this way disappear in their passage through the intestinal canal. Another is, they do not reach the duodenum, but return to the gall-bladder. They are in some rare instances vomited. They may find lodgment in the cæcum, and remain there indefinitely, especially if a cathartic be not given; and they sometimes gain entrance into the appendix vermiformis, remaining there perhaps latent for a greater or less period, or giving rise to ulceration and perforation.

It is desirable to obtain calculi contained in the dejections for another reason than to demonstrate the correctness of the diagnosis. The appearances which they present may enable the physician to judge of the probability of others remaining in the gall-bladder. If a stone be globular or oval in form, there is reason to think that it was a solitary occupant of the gall-bladder; but if it present smooth plane surfaces or *facets*, others remain, provided they had not previously escaped.

Treatment of the Passage of Gall-stones or Hepatic Colic.

The objects of treatment during the paroxysm are to relieve the fever, and to promote the passage of the gall-stone. For both these objects the measures are opium, the warm bath, with local fomentations, and the inhalation of chloroform. Opium should be given in doses sufficient to ameliorate the pain, but not carried to the extent of incurring any risk of narcotism. The hypodermic method of administration is to be preferred. The warm bath, of a temperature as high as can be comfortably borne, may be continued for from fifteen to thirty minutes, and repeated from time to time. If the paroxysm continue, warm fomentations may be employed by means of poultices or the spongio-piline. When not in the bath, chloroform may be inhaled until the consciousness of pain is lost, and the inhalation repeated as soon as the feeling of suffering returns. Of course, the latter measure should be employed always under medical supervision. By these measures, especially the use of opium and chloroform, the patient is saved great intensity of suffering. There is reason to think that they are not merely palliative, but that they shorten the duration of the affection by promoting the passage of the calculus. Emetics and active cathartics are contraindicated. They cannot do good, and may do much harm.

The prognosis in cases of hepatic colic is generally favorable. It is stated that death has resulted from shock and the intense pain, but, if such instances have occurred, they are so rare that they need not be considered with reference to danger. The chief sources of danger are the permanent impaction of a calculus in the duct, and perforation, the calculus and bile escaping into the peritoneal cavity.

The prophylaxis of gall-stones may be noticed here instead of in connection with the diseases of the gall-bladder. When an attack of hepatic colic has once occurred, the prevention of the formation of gall-stones becomes an object of treatment; and it is also desirable, if practicable, to effect the solution of stones which may have already formed, and are contained in the gall-bladder. Of the efficacy of remedies given with a view to the first of these objects, it is impossible to obtain positive proof, because, if, after the use of any remedy, there is never evidence of the existence of biliary calculi, how is it to be ascertained that they would have existed if the remedy had not been given? But, inasmuch as the chief constituents of biliary calculi (cholocrome and cholesterine) are supposed to be held in solution in the bile by the presence of a soda salt (glycocholate), it is a reasonable supposition that the bicarbonate of soda and other alkalies may prevent the precipitation of these constituents. Experience seems to sustain this supposition. The apparent usefulness of alkaline mineral waters, such as those of Carlsbad, Vichy, and Ems, may be in fact thus explained. The free use of simple water is probably beneficial in this way, experiments on inferior animals showing that the water which bile contains is thereby increased. The efficacy of mineral springs is thus partly explicable. Dr. J. H. Buckler advocates, as a preventive remedy, the hydrated succinate of the peroxide of iron, an ounce and a half to be dissolved in six and a half ounces of water, a teaspoonful after each meal, the remedy to be continued for several months. The choleate of soda has been recommended as a prophylactic remedy by Prof. Schiff, and by Dr. Dabney, of Virginia. The former advises about 7½ grains twice daily, to be continued until it occasions gastric disturbance. The latter gives 5 grains twice daily, suspending the remedy after two weeks, for a month, and then resuming it.[1]

Hygienic measures of treatment are probably more important than the use of drugs. The diet should be abundant, but simple and wholesome, not containing an undue proportion of animal food and fats. Habits of exercise and out-of-door life are especially to be recommended.

---

[1] *Vide* Am. Journ. of Med. Sciences, April, 1876.

That remedies will effect the solution of biliary calculi within the gall-bladder, can only be proved in the comparatively few cases in which their presence can be ascertained by palpation. It is claimed that proof has been obtained in these cases, the calculi disappearing under the use of remedies.[1] Remedies supposed to effect this object are the combination of sulphuric ether and turpentine (3 parts of the former to 2 parts of the latter), long known as Durande's remedy, half a fluidrachm to be taken every morning for over a year. Chloroform has been recommended by J. H. Buckler and Bouchet as an efficient solvent. Cases have been reported in which numerous gall-stones have passed into the duodenum, notwithstanding the faithful employment of the remedies supposed to be capable of effecting their solution and preventing their formation. As regards chloroform, it does not appear that gall-stones dissolve readily in chloroform added to bile out of the body.[2]

DISEASES OF THE GALL-BLADDER.

The gall-bladder must be enlarged sufficiently to be examined by means of palpation in order for the recognition of its diseases. The only exception to this statement is the formation of biliary calculi (cholelithiasis). This is inferred from the passage of gall-stones into the duodenum.

An enlarged gall-bladder generally forms a pyriform tumor at the lower margin of the liver. The normal situation of the gall-bladder is to be borne in mind. It is situated "under the free border of the ribs, at a point where it is crossed by a line drawn from the point of the shoulder to the symphysis pubis. Only when the right lobe has become considerably enlarged can the gall-bladder occupy a position on a line from the nipple to the umbilicus, which is sometimes given as its natural position."[3]

Moderate or sometimes considerable enlargement accompanies, as already stated, obstruction of the cystic and common duct. When dependent on obstruction of the common duct, it is accompanied by jaundice. The tumor is readily recognized. In addition to its situation and form, it has a smooth surface; it is an elastic and sometimes fluctuating tumor, projecting beyond the inferior margin of the liver, following the movements of the latter with forced inspiration and expiration. It may be diminished in size, and is sometimes made to disappear, by pressure, the contents being expelled through the biliary ducts.

Enlargement may be caused by an accumulation of purulent or a muco-serous liquid (cholecystitis), either with or without jaundice, in the latter case the cystic duct being obstructed. It becomes in some instances greatly dilated by these morbid products. Cases have been reported in which it formed a tumor occupying a considerable portion of the abdominal space. The form of the tumor is, of course, altered when the dilatation is very great. Enlargement is sometimes caused by the presence of biliary calculi. The latter may be felt in some cases as movable solid bodies within the tumor. Percussion or palpation may give rise to a sound produced by the rubbing together of the calculi. Another cause of enlargement is a cancerous growth having its point of departure in the walls of the gall-bladder. This is sometimes primary and sometimes secondary to cancer seated either in the liver or elsewhere.

---

[1] *Vide* Principles and Practice of Medicine by the author, 4th edition, page 459.

[2] *Vide* article by Dr. Ralph S. Goodwin, of Thomaston, Ct., in New York Medical Record, March 20, 1875.

[3] On the Diagnosis of Hepatic Affections, by Prof. E. G. Janeway. Series of American Clinical Lectures, edited by E. C. Seguin, M.D., vol. iii., No. 5, 1877.

In cases of enlargement of the gall-bladder from inflammatory products, the tumor is sometimes painful and extremely tender on pressure. The tenderness interfering with a thorough examination, phlegmonous inflammation within the abdominal parietes may be inferred. An instance of this kind has fallen under the author's observation, the nature of the affection being shown by the sudden disappearance of the tumor under pressure when the tenderness had diminished. The mistake of confounding suppurative inflammation for hepatic abscess, is to be avoided by ascertaining the relations of the tumor to the lower extremity of the liver, and the previous history. In other cases, the inflammation being subacute and the products muco-serous, the tumor is indolent. Such a tumor may be mistaken for a movable kidney. An enormously distended gall-bladder may simulate peritonitis or ovarian disease. The unequal enlargement of the abdomen excludes the former. The connection with the liver, as shown by the continuity of the tumor with that organ, and the effects of a forced inspiration and expiration, distinguish it from the latter. The localization of the tumor before it attained to a large size will exclude both these affections. In all cases of doubt there can be no risk in exploring by means of a small canula or hollow needle. The liquid withdrawn will be likely to contain bile elements which will establish the diagnosis.

Cancer is discriminated from the other affections causing enlargement, by the irregularity of the surface of the tumor, the absence of the signs of liquid, the presence of tenderness, and lancinating pains, these local evidences, taken in connection with the general symptoms, denoting malignant disease, and, in a certain proportion of cases, the existence of cancer in other situations. The gall-bladder affected with cancer generally contains biliary calculi. Jaundice often occurs in connection with this disease.

Treatment of Diseases of the Gall-bladder.

Enlargement of the gall-bladder from an accumulation of bile, pus, or a muco-serous liquid, if not great, does not call for active interference beyond judicious efforts to expel the distending contents, by pressure, through the cystic and common duct into the duodenum. These efforts should not be so forcible as to incur any risk of producing rupture of the gall-bladder, the result of which would be fatal peritonitis. When the enlargement is accompanied by pain and tenderness, these symptoms are to be relieved by the local application of poultices or the spongio-piline, and anodyne liniments.

Great enlargement involves more or less danger from perforation or rupture of the walls of the gall-bladder. In order to avoid this danger, it is desirable to remove the liquid contents of the gall-bladder. The author cannot speak from personal observation, but aspiration would seem to be safe, and the simplest method of effecting this object. If the liquid be pus, it may be advisable, employing proper precautions, as regards being sure of peritoneal adhesions, to make a free incision as in cases of hepatic abscess. In addition to the local treatment, tonic and analeptic measures are to be employed.

Gall-stones sometimes make their way by ulceration and perforation into the intestinal canal, or externally through the integument. The propriety of making an incision into the gall-bladder, and removing them, is a surgical question which the author is not prepared to discuss. An eminent surgeon has related to him a case in which a large number of gall-stones were discharged externally from a spontaneous opening large enough to admit the finger, which was introduced into the gall-bladder, and the fact that all the stones had escaped in this way ascertained. Another surgeon, who wished to verify this fact, passed into the gall-bladder his finger, and, on withdrawing it, a portion of intestine protruded. Fatal peritonitis followed. This case illustrates the protective agency of peritoneal adhesions around the opening, and the danger of surgical interference, if these have not taken place.

Cancer of the gall-bladder offers no indications for treatment beyond palliative and supporting measures.

VIII.

DISEASES OF THE SPLEEN.

SPLENITIS AND ABSCESS OF THE SPLEEN. WAXY DEGENERATION. CARCINOMA. HYDATIDS.

THE diagnosis of diseases of the spleen is limited to its enlargement, together with some other physical changes therewith associated. This organ is often enlarged, but, with rare exceptions, it is affected secondarily. The enlargement is a pathological effect of a variety of diseases, namely, the continued and periodical fevers, pyæmia, leucocythemia, cirrhosis of the liver, etc. The diseases of the spleen recognized as such nosologically, and recognizable in some instances at least clinically, are splenitis and suppurative inflammation or abscess, waxy degeneration, carcinoma, and hydatid disease.

Splenic enlargement is ascertained by means of percussion and palpation; and, of course, the size of the organ in health, as determined by physical signs, is the point of departure for determining whether it be morbidly enlarged, and to what extent. The spleen is variable in size, within normal limits, not only in different persons, but in the same person at different times. Being a movable organ, its situation varies somewhat with the position of the body; it is depressed by the movements of the diaphragm in inspiration, and raised in expiration; it is displaced upward by distension of the stomach and colon. Certain affections within the chest—pleurisy with effusion, empyema, emphysema, and pneumothorax—and of the abdominal viscera, may alter very considerably its situation. The author has met with an instance in which, after confinement, it descended to the pelvis, whence it was easily returned by the hand to its normal situation. When neither displaced nor enlarged, it is concealed within the ribs, and can rarely be felt. In some instances, however, if the abdominal walls be thin and flaccid, the lower extremity may be brought by a deep inspiration within reach of the touch. Its upper extremity can be determined readily by percussion. The line of splenic dulness or flatness denotes very accurately the situation of this extremity, which will be found to vary from one to two inches by percussion at the end of a deep inspiration and of a forced expiration. The posterior border is not determinable, owing to its relations to the left kidney. The anterior and the lower extremity can be determined approximately by the tympanitic resonance derived from the stomach and colon. The situation of the upper extremity is near the ninth, and, of the lower extremity, near the eleventh rib. The anterior border does not extend to the right of the middle axillary line. The examination by percussion is best made when the person examined lies on the right side.

When the spleen is enlarged, as a rule the greater part of the increased space which it occupies is downward, and toward the median line; the upper extremity is not greatly raised unless there are abdominal conditions which push the organ upward. It rarely extends above the fifth rib. If the enlargement be considerable, the lower portion of the organ can be examined by palpation. It gives to the touch a sense of resistance continuous from the ribs. This sense of resistance is abruptly lost at the inner and lower margins. The situations of the margins can be determined approximately by percussion, not accurately on account of the transmission of tympanitic resonance by the solid organ for a certain distance. Considerable enlargement often causes a visible projection of the abdomen over the site of the organ; the outline of this projection sometimes represents the form of that portion of the organ which is below the ribs. Generally the surface of the organ is felt through the abdominal walls to be smooth; but, in cases of cancer, abscess, and hydatids, a nodulated surface may be appreciable by the touch. With the exception of the affections just named, the enlargement of the organ is symmetrical—that is, it retains its normal form. The relative softness or hardness of the surface may be judged of by palpation. With the fingers applied to the lower extremity of the organ, its descent with a forced inspiration is perceived. Passing the finger over the inner extremity the hilus is often recognized; this is conclusive proof that the solid body felt is the spleen. The organ is sometimes enlarged to such an extent as to occupy a considerable portion of the abdominal space, its lower extremity extending nearly to the pubis. By attention to the foregoing points, enlargement of the spleen is generally without difficulty recognized and discriminated from other abdominal tumors. A large amount of peritoneal effusion may render the percussion and palpation unavailable; if, however, the quantity of liquid be not great, it is displaced by pressure with the fingers, and the limits of the enlarged organ may be ascertained quite as well as if there were no effusion.

SPLENITIS AND ABSCESS OF THE SPLEEN.

Splenitis, not leading to abscess, but giving rise to the morbid appearances found after death, with which pathologists are now familiar as effects of hemorrhagic infarction, may be sometimes diagnosticated with much confidence. The local symptoms are localized pain and tenderness due to perisplenitis. With these symptoms the organ becomes somewhat enlarged. A chill or a series of chills may take place, and vomiting is not infrequent. If these phenomena occur in a patient affected with valvular disease of the heart, the diagnosis is extremely probable.

Abscess of the spleen, exclusive of the multiple abscesses occurring in cases of pyæmia, is extremely rare. Drake, from his inquiries of medical practitioners over a large extent of territory, obtained information of eleven cases.[1] Of these eleven cases, the discharge of pus in six was by the bowels; in three externally; in one case both externally and by the bowels; and in one no evacuation took place. One of the cases only terminated fatally.

Without enlargement and the sense of fluctuation over the enlarged organ, it must be difficult, if not impossible, to make a positive diagnosis. With these evidences, the existence of an abscess may be demonstrated by means of an exploratory puncture, which, under these circumstances, should be resorted to.

WAXY DEGENERATION OF THE SPLEEN.

This rarely exists without the same degenerative affection of the liver or kidneys, or of both these organs. The local diagnostic signs are those of enlargement of the organ, with notable hardness or resistance to the touch. The known causative conditions of waxy disease are to be taken into account as in determining waxy degeneration of the liver and kidneys. The diagnosis must be based in a great degree on these, if there be no evidence of disease of the organs just named.

CARCINOMA OF THE SPLEEN.

Carcinomatous disease of this organ is very rare, and is always secondary. A nodulated enlargement, with more or less localized pain and tenderness, and the existence of carcinoma in some other situation, render the diagnosis positive.

---

[1] The Principal Diseases of the Interior Valley of North America, vol. ii. p. 160.

HYDATIDS IN THE SPLEEN.

This organ is very rarely the seat of hydatid productions. The affection can only be diagnosticated when a fluctuating tumor is felt, which, by means of an exploring puncture, is found to furnish a characteristic liquid (*vide* page 382).

Treatment of Splenitis and Abscess of the Spleen, Waxy Degeneration, Carcinoma, and Hydatid Disease.

Local emollient, and anodyne applications are indicated by the pain and tenderness in cases of splenitis. It is doubtful if local depletion by leeches, and active counter-irritation, be advisable. Dry cupping may tend to diminish the hyperæmia of the organ, and, probably, in this way is as effective as the local abstraction of blood. Sinapisms or other mild irritants will do as much good as blisters, pustulation with croton oil, the tartrate of antimony, etc. The general treatment is to be governed by symptomatic indications.

Abscess of the spleen, as respects treatment, is the analogue of hepatic abscess.

Waxy degeneration of this organ is in the same category with the same affection of the liver. This statement applies equally to carcinoma and hydatid disease.

IX.

DISEASES OF THE PANCREAS.

THE pancreas may be the seat of the various diseases which affect the other solid viscera of the abdomen, namely, suppurative and interstitial inflammation, fatty and waxy degeneration, tuberculous and syphilitic growths, cystic formations, and carcinoma. Happily for the diagnostician, as well as patients, they are extremely rare in this situation. As a general statement, they defy diagnosis. Fatty diarrhœa (*vide* page 259) renders the existence of pancreatic disease probable, but the latter can by no means be excluded by the absence of the former. A carcinomatous affection may be recognized as a tumor, and, taking into consideration local and general symptoms, together with, perhaps, the existence of cancer in some other situation, the seat and nature of the affection are probable, provided cancer of the pylorus can be excluded. An enlarged pancreas, from its relations to the aorta, may simulate aneurism. The latter is to be excluded by the absence of its diagnostic characters (*vide* page 242).

Calculi, which are known to form sometimes in the pancreatic ducts, may occasion, during their passage into the intestine, attacks resembling hepatic colic, and the differential diagnosis is impracticable.

In persons with thin and relaxed abdominal walls, when the stomach and duodenum are free from gaseous and other contents, the healthy pancreas is sometimes perceived by palpation, and may be mistaken for a scirrhous pylorus.

The therapeutical indications in diseases of the pancreas are essentially the same as in analogous diseases of the liver and spleen.

SECTION FOURTH.

DISEASES OF THE URINARY SYSTEM.

PRELIMINARY OBSERVATIONS.

Symptoms relating to the urine—Quantity, specific gravity, reaction, and general appearance of the urine—The amount of urea—Albumen in the urine—Blood in the urine—Pus, casts, and epithelium in the urine—Uræmia: its symptoms, effects, and treatment.

THE most important of the symptoms which are diagnostic of the diseases embraced in this section, relate to abnormal conditions of the urine. Of the great number of morbid changes determined by physical, chemical, and microscopical examinations of the urine, those will be here considered which are of importance in the diagnosis and treatment of the diseases of the urinary system. Many deviations from normal urine are symptomatic of diseases embraced in other sections. Examples are the presence of bile, leucine and tyrocene, lead, crystals of the oxalate of lime, an excess of phosphates, a deficiency of the chlorides and of uric acid, etc. These are appropriately referred to in connection with the diseases with which they have pathological relations.[1]

The accumulation in the blood of excrementitious principles which it is the office of the kidneys to secrete, chiefly urea (uræmia), gives rise to a number of pathological effects which are symptomatic of renal diseases. Knowledge of these effects being essential as entering into the diagnosis and the treatment of this class of diseases, they will be here considered.

General dropsy is symptomatic of certain of the diseases of the kidneys. This has been already considered as preliminary to the diagnosis and treatment of the circulatory system (*vide* page 188 *et seq.*).

SYMPTOMS RELATING TO THE URINE.

Inasmuch as an interrogation of the urine may furnish diagnostic symptoms of renal diseases, not only more definite and reliable than evidence derived from other sources, but, in some cases, when there are not grounds for even suspecting that the kidneys are diseased, it is an important practical rule never to omit examinations sufficient either to establish or exclude diseases seated in these organs. This rule is important in cases of other than renal diseases, because the latter are often associated with various local and general affections. The investigation of a case of disease is never complete without having ascertained whether the kidneys are, or are not, involved. The points of inquiry in examining the urine, with reference to the existence or non-existence of disease of the urinary system, relate to quantity, specific gravity, reaction, and general appearance; the amount of urea; the presence of albumen (albuminuria), blood (hæmaturia), hæmatin (hæmatinuria, hæmoglobinuria), pus (pyuria), epithelium, and urinary casts. When there are no symptoms pointing to renal disease, it suffices, in most cases, for their exclusion, to examine the urine with reference to its acid or alkaline reaction, its specific gravity, and the presence of albumen, ascertaining the quantity passed in a given period. An examination with reference to these points requires, on the part of the physician, but little time, and gives but little trouble.

---

[1] As a comprehensive and elaborate work, the reader is referred to "A Guide to the Qualitative and Quantitative Analysis of the Urine, designed for Physicians, Chemists, and Pharmacists, by Dr. C. Neubauer and Dr. J. Vogel;" translated by Dr. Elbridge G. Cutter, and revised by Dr. Edward S. Wood. New York, 1879.

Quantity, Specific Gravity, Reaction, and General Appearance of the Urine.

The normal quantity of urine passed in twenty-four hours, varies between thirty and sixty ounces. Transient variations beyond these limits are very common, arising from either diminution or increase of the cutaneous and pulmonary exhalations, the quantity of liquids ingested, mental conditions, etc. The quantity is to be considered as morbidly increased or diminished only when it either exceeds or falls below the physiological limits of variation habitually, or at least continuously for a certain period—days, weeks, or months. Whenever it is important to obtain definite information concerning quantity, all the urine passed in twenty-four hours should be collected and measured. In order to avoid error from transient influences on the day when the urine is collected, the quantity should be ascertained either on several successive days, or repeatedly after short intervals. The frequency or infrequency of the acts of urination cannot be relied upon as a guide to the quantity passed in a given time. The number of these acts depends much on habit; persons are apt to urinate often if their attention be directed to the matter, and in this way the tolerance of the bladder becomes impaired. Much reliance cannot be placed on the estimate by the patient of the quantity of urine passed.

An excessive quantity of urine, persisting sufficiently to constitute a symptom of disease, denotes either an undue proportion of water (*hydruria*) or the presence of sugar (*glycosuria*). The former is determined by a low, and the latter is rendered probable by a high, specifi gravity. The specific gravity, taken in connection with the quantity, i an important point in examination of the urine, representing, as it doe the quantity of solid constituents held in solution. The average norm specific gravity, and the range of physiological variations, are, of cours *to be* borne in mind. The average in health is about 1.020, and t healthy limits vary from 1.015 to 1.025. For clinical purposes the urinometer suffices to determine the specific gravity. In using this instrument there are certain precautions which are so obvious that it is hardly necessary to mention them, namely, the specimen of urine examined should be large enough to float the instrument; the instrument should not touch the sides of the glass which holds the specimen, and care is to be taken in observing on the stem of the instrument the numerical mark which is exactly at the level of the liquid.

To determine the precise amount of the solid constituents of the urine, is, in general, not important in a clinical point of view. Fenwick gives a very simple method by which a rough estimate may be obtained, namely, ascertain the specific gravity, and multiply the last two figures by 2. One thousand grains of urine, with a specific gravity of 1.020, according to this rule, contains 40 grains of solid matter.[1] A more accurate result is obtained by reference to tables which are calculated to show the number of grains of solids in a fluidounce of urine of different densities.[2]

In order to determine, either approximately or accurately, the solids in the urine, the quantity passed in a given time must be ascertained. Preserving all the urine passed in the twenty-four hours is sometimes difficult, and occasions considerable inconvenience. This is chiefly required to be kept up when it is important to know the amount of solids excreted with reference to the liability to the effects of uræmia. In most cases it suffices to examine specimens of the urine for the density and other characters. The specimen examined should be taken from the morning's urine, that is, the urine passed before breakfast. The urine passed at that time represents more fairly than at other periods of the day conditions connected with renal disease.

Diminution of the solid constituents of the urine is of importance especially as denoting a deficient elimination of excrementitious principles, the most important of which is urea. The retention of urea in the blood in consequence of deficiency in its excretion, gives rise to phenomena which will be considered under the heading Uræmia. Complete suppression of urine is sometimes incident to renal disease. If the suppression continue for any considerable period, uræmia is a necessary consequence, and death is inevitable. Death produced purely from suppression occurs within a period of from nine to eleven days. It takes place sooner in cases involving concurrent causes, and exceptional instances have been observed in which the duration of life has extended beyond eleven days. The reported cases in which death has not taken place until after many weeks or even months, are to be discredited. It is one of the multifarious forms of imposition to pretend that there has been no passage of urine for an incredible length of time.

The acid or alkaline reaction of the specimen of urine examined, is obtained by means of litmus or turmeric test-paper. Alkalinity of the urine may be caused by chemical changes after its passage, and, therefore, to determine that it was alkaline within the body, it should be tested directly or very soon after it has been passed. If alkaline when voided, it may have become so within the bladder, owing to undue retention or the presence of morbid products—mucus in more or less abundance, or pus. If not produced within the bladder, the alkalinity represents an abnormal condition of the blood, which may be caused by an excess of vegetable food or the use of alkaline remedies. However produced, the fact that the urine is alkaline has no diagnostic significance as regards disease of the kidneys. It is chiefly important from its interference with testing for other urinary conditions, and especially for the presence of albumen.

---

[1] *Vide* Guide to Medical Diagnosis, American ed., page 133.

[2] *Vide* Manual of Chemical Examination of the Urine in Disease, by Austin Flint, Jr., M.D. Fifth edition, 1878.

Deviations from the usual amber color of the urine, in connection with various diseases, and, also, within physiological limits, are so common that they are of no value in respect of the diagnosis of renal disease. Certain abnormal appearances, however, are of importance. A smoky or sooty coloration from the presence of a small quantity of hæmatin, is highly diagnostic of parenchymatous nephritis. Blood in larger quantity is often apparent to the naked eye. The urine is turbid from the presence in abundance of the phosphates or urates, and of mucus or pus. The former are not evidence of renal disease. They are dissolved, and the urine becomes clear, on the addition of nitric acid. The examination for pus will be noticed under a distinct heading. The presence of mucus in considerable quantity is recognized by its stringy appearance. Urine which froths notably when passed into a vessel, and retains the bubbles for some time, is probably albuminous. This is by no means to be relied upon as adequate evidence of the presence of albumen.

In regard to the general appearance of the urine, the most important conclusion is, that the practitioner must not be satisfied by any information thereby obtained in the diagnosis of renal diseases. Nothing discoverable with the naked eye can do away, in any measure, with the necessity of other methods of examination.

The Amount of Urea.

In judging of the pathological significance of the amount of urea in the urine, the variations which are independent of renal disease must be taken into account. These are considerable. The amount varies according to diet, being notably increased if the diet be purely animal, and as notably diminished by a purely vegetable diet. Active or prolonged muscular exercise increases the amount considerably, and the absence of exercise has an opposite effect equally marked. The amount excreted in cases of renal diseases has a most important bearing upon the interpretation of the phenomena of uræmia, the appreciation of danger from the grave effects of the accumulation of urea in the blood, and the therapeutic indications when these effects have taken place. Clinically, to determine whether sufficient urea is excreted for protection against the dangers of uræmia, is a point of inquiry second in importance to no other in the investigation of cases of renal disease. In general, the quantity of urine passed in a given period (twenty-four hours) and the specific gravity may be relied upon for the answer to this inquiry. A patient is safe as regards uræmia so long as the quantity of urine and the specific gravity are within the physiological limits of variation. This is assuming that the specific gravity represents the amount of urea in the urine. Practically this assumption is admissible. A low specific gravity, together with diminished quantity of urine, shows deficiency of urea. If the quantity of urine be diminished, and the specific gravity be proportionately increased, there is no ground for apprehension; or, if the specific gravity be low, and the quantity of urine be proportionately increased, the same conclusion is warrantable. It is evident that the specific gravity of a specimen of urine must always be considered in connection with the quantity in determining the amount of urea; and it is with reference to this connection especially that the quantity of urine passed in the twenty-four hours should be accurately ascertained. The latter must not be omitted when it is important to determine the existence of, or the liability to, uræmic phenomena. The importance of the connection of the specific gravity with the quantity of the urine, is to be enforced the more because, perhaps, it is not always sufficiently appreciated by practitioners.

Naturally the questions arise, what degree of diminished excretion of urea, as determined by the specific gravity and the quantity of urine, is attended with danger from uræmia? and is the danger from uræmia always proportionate to the small amount of urea excreted? Clinical observation shows that the danger from uræmia cannot be determined with exactness by the degree of diminution of urea in the urine, and that there is no fixed rule of proportion between the degree of danger and the decrease of urea. The danger is undoubtedly lessened in so far as the urea in the blood is eliminated vicariously by the skin and gastro-intestinal mucous membrane; but the amount of this elimination cannot be ascertained. The danger also appears to depend in a great measure on the rapidity with which the accumulation of urea in the blood takes place. Tolerance of urea, as of opium and other poisons, may be acquired; and, if the accumulation of urea have been slow, a considerable diminution of the quantity contained in the urine may not be accompanied by uræmic manifestations, whereas these may quickly be induced by a much less amount of elimination which takes place rapidly. These considerations have a bearing on prognosis and treatment.

An exact quantitative analysis of the urine for urea is not necessary for clinical purposes. Approximatively, the amount contained in a given quantity of urine is readily determined by reference to Prof. Haughton's table, in which the amount in an ounce of urine is calculated from the specific gravity. For this table, and the different methods of obtaining more accurate results, the reader is referred to other works.[1]

Albumen in the Urine. Albuminuria.

Albumen is not a constituent of the urine in health; its presence is always abnormal.

The appearance of a specimen of albuminous urine affords no evidence of its containing albumen, except that already stated, namely, it froths on agitation more than normal urine, and the air-bubbles, or beads, remain for a longer period. The albumen, however, in most specimens, is readily isolated by the tests in common use. It is coagulated by heat and the addition of nitric acid. These tests are sufficient for all clinical purposes. In testing by heat, a test-tube partially filled with urine is held over the flame of a spirit-lamp or a jet of burning gas; when the heat is raised nearly or quite to the boiling-point, the specimen becomes opaque, and the coagulated albumen shortly forms a white deposit at the bottom of the tube. The same results follow the addition of a little nitric acid.

---

[1] *Vide* Practical Treatise on Urinary and Renal Diseases, by William Roberts, M.D., second American edition, 1872.

There are some liabilities to error against which precautions are to be taken. If the urine be alkaline, the albumen may not be coagulated by heat. This method, therefore, is not to be relied upon unless the reaction be found to be acid by the litmus-paper test. The addition of a few drops of acetic acid before boiling will obviate the liability to error. The application of heat to alkaline urine sometimes renders it opaque from the precipitation of the earthy phosphates, and the appearance may be mistaken for that caused by coagulated albumen. By the addition of nitric acid the phosphates are redissolved, and the urine becomes clear, an effect not produced if the opacity or cloudiness be due to albumen. On the other hand, nitric acid, added to urine holding in solution an excess of the urates, may cause a precipitation of these or of uric acid, rendering the specimen turbid. The error of attributing the turbidity to albumen is obviated by afterwards heating the specimen, the urates dissolving in warm urine. As conclusions from these facts, acid urine, which remains clear after having been heated to the boiling-point, does not contain albumen; the same is true of urine to which nitric acid is added; opacity, or a white deposit produced by heat, is evidence of albuminous urine, if not disappearing on the addition of nitric acid; these effects produced by the addition of nitric acid are due to the presence of albumen, if they do not disappear on the application of heat.

It is important to ascertain whether the quantity of albumen in a specimen of urine be large, considerable, moderate, small, or a mere trace. These terms express relative quantities with sufficient precision for clinical purposes. It suffices to coagulate the albumen by heat, allow it to form a deposit at the bottom of the test-tube, and then note the space which the deposit occupies relatively to the liquid; or, add to a specimen in a test-tube a small quantity of nitric acid, allow the coagulated albumen to fall to the bottom of the tube; then add another quantity of the acid, and continue to add the acid, after little intervals of time, until in this way all the albumen is deposited. An exact quantitative examination is, clinically, not essential. If, however, this be desired, Panum's method may be adopted, as follows: To equal parts of urine and a concentrated solution of the sulphate of soda (Glauber's salt), add a liberal quantity of acetic acid, and apply heat. The resul is a coagulation of all the albumen contained in the specimen. Afte washing the coagulum, dry it at a temperature of 212° F.,[1] and ascertai its weight.

---

[1] *Vide* article by Bartels, in Ziemssen's Cyclopædia, Am. edition, vol. xv. p. 30.

The presence of albumen in the urine is by no means always evidence of renal disease. If the urine contain pus or blood, it is albuminous, the quantity of albumen being small. A highly albuminous diet may have this effect. Diseases which occasion congestion of the systemic venous system give rise to albuminuria. It occurs in cases of dilatation or even distension of the right side of the heart—the former from mitral obstructive or regurgitant lesions and pulmonary emphysema; the latter from pneumonia or a large accumulation of liquid in a pleural cavity—and in a certain proportion of cases of all the essential fevers. It is a not infrequent effect of the pressure of the uterus on the inferior cava and renal veins in pregnancy. It is observed in some cases of purpura, scorbutus, and lead-poisoning. It is of transient occurrence sometimes when the causation is not apparent, and, under these circumstances, may give rise to apprehensions which prove to have been gratuitous. The author has recently met with an instance of this kind. If, however, it be persistent, if it be associated with other symptoms pointing to an affection of the kidneys, and causes irrespective of the latter be not apparent, it is proof of renal disease. The fact of albuminuria existing almost invariably in certain affections of the kidneys, renders it a most important diagnostic symptom. Moreover, the quantity of albumen contained in the urine is of great importance in differentiating different renal affections, and in estimating their gravity. The relations of albuminuria to general dropsy may be here stated. With a small or moderate amount of dropsy dependent on renal disease, the urine is always albuminous. As a rule, with a considerable or large amount of dropsy, there is a considerable or large amount of albumen in the urine. The author's clinical studies have shown this correspondence of the degree of dropsy with that of albuminuria.[1]

Blood in the Urine. Hæmaturia. Hæmatinuria.

Blood in the urine, if the quantity be considerable, and even if it be moderate or small, is generally easily recognized by the naked eye. It imparts to the urine either a bright red, or dark brown, and sometimes a black coloration. If there be doubt as to the coloration being due to blood, the microscope usually shows blood disks more or less deformed. The blood pigment (hæmatin, hæmoglobin) may be present without blood disks. In these instances of so-called false hæmaturia (hæmoglobinuria, hæmatinuria), the blood disks have undergone disintegration either within the bloodvessels, the pelvis of the kidney, or the bladder. The presence of the coloring matter, without the morphological characters of blood, may occur in septicæmia or pyæmia, scorbutus, purpura hæmorrhagica, and the essential fevers. It characterizes the affection known as paroxysmal hæmatinuria, which will be considered in connection with hæmaturia. The presence of blood pigment, without globules, is determined by boiling the urine, either alone or after the careful addition of a little acetic acid. "A more or less abundant brownish-red coagulum forms in it, which is precisely similar to that which blood diluted with water gives on being boiled. If this coagulum is then boiled with alcohol which contains sulphuric acid, the fluid becomes colored reddish-brown by dissolving hæmoglobin."[1]

---

[1] *Vide* A Clinical Report based on an Analysis of One Hundred and Two Cases of Bright's Disease, in Bellevue and Charity Hospital Reports, 1870.

Urine which is truly bloody, that is, containing blood globules, occurs in local affections of the bladder and urethra. The latter sources are to be excluded in ariving at the conclusion that the blood denotes a renal hemorrhage. This is rarely difficult, inasmuch as other symptoms and the result of explorations generally lead to the diagnosis of cystitic and urethral affections. Of the diseases of the kidney, blood in the urine is a symptom in cases of acute parenchymatous nephritis, cancer, hydatid disease, nephritic colic, and pyelitis. It characterizes certain casts of the uriniferous tubes. When the hemorrhage is more or less profuse, the fibrin of the blood may coagulate in the ureters, and appear in the urine as vermiform casts of these tubes, having a resemblance to lumbricoid worms. The presence of these is proof that the hemorrhage is renal. Their passage from the ureter to the bladder gives rise to the symptoms which characterize nephritic colic.

Hæmaturia, not connected with any of the diseases which have been referred to, is reckoned, nosologically, a distinct affection, and, as such, will be considered in this section, together with the affection distinguished as hæmatinuria or hæmoglobinuria.

Pus in the Urine.

Pus in the urine may be derived from other sources than the kidney, namely, an inflamed bladder (cystitis), inflammation of the urethra and of the vagina (urethritis and vaginitis). An abscess in the prostate gland or in the perineum may open into the urethra. These several sources of purulent urine are to be eliminated in determining that the source of the pus is renal. This is attended with but little difficulty; the several sources, exclusive of the kidney, are generally clearly indicated by the associated symptoms, and their absence warrants the exclusion of the different affections which would account for the presence of pus. On the other hand, if the source of the pus be renal, other symptoms point to an affection of the kidney.

In a majority of the cases in which the source of the pus is renal, it denotes inflammation of the pelvis of the kidney (pyelitis). In a minority of cases there is abscess of the kidney (suppurative nephritis). Both affections may coexist. With either of these affections, the symptoms, other than the presence of pus in the urine, show that one kidney is the seat of disease; the affection, as a rule, is unilateral. As between pyelitis and renal abscess, a differential diagnostic point is, in the latter the presence of pus in the urine occurs suddenly in more or less abundance. Moreover, as pyelitis is generally a result of the presence of renal calculi, the purulent urine is apt to be preceded by attacks of nephritic colic. A perinephritic abscess which opens into the pelvis of the kidney is not readily discriminated from renal abscess.

---

[1] *Vide* Analysis of the Urine, by Neubauer and others. New York edition, 187 *page 392.*

The gross characters which denote the presence of pus in the urine are diagnostic. The urine is turbid, and the pus forms a whitish deposit which falls to the bottom of the liquid. The microscope, if the specimens examined be recent, furnishes demonstrative proof of the character of the sediment. The pus-corpuscles are readily recognized, especially when acetic acid is added so as to display their nuclei. If the urine be alkaline from the decomposition of urea, that is, rendered ammoniacal, the purulent deposit is gelatinous or stringy, and this effect is produced by the addition of an alkali. Under these circumstances, the pus-corpuscles may be destroyed. Purulent urine is more or less albuminous from the presence of albumen in the liquor puris. The amount of albumen is in proportion to the quantity of pus. To form a judgment in regard to this proportion is important in order to determine whether the albumen in the urine is evidence of renal disease. The presence or absence of urinary casts has an important bearing on this diagnostic question.

Casts and Epithelium in the Urine.

Information of importance in diagnosis is derived from the presence in the urine of the different varieties of casts or moulds of the uriniferous tubes. Their absence is also important in excluding renal diseases. The specific gravity of casts being greater than that of the urine, they are to be sought after in the sediment. For an examination with reference to casts and also epithelium, a considerable quantity, eight or ten ounces at least, should be allowed to remain undisturbed for several hours, and portions of the sedimentary deposit placed under the microscope. Several portions of the deposit should be examined before concluding that casts are not present. From the number observed in the field, some idea may be formed of their abundance or otherwise in the specimen of urine examined.

The more important of the varieties of casts are as follows: epithelial, granular, waxy or hyaline, fatty, bloody, and purulent.

The epithelial casts are distinguished by presenting on their exterior, and being in fact composed of, desquamated epithelial cells from the uriniferous tubes. They are found especially in the early stage of acute parenchymatous, tubal, or desquamative nephritis.

Granular casts are so called from the appearance of dark granules which are disintegrated epithelial cells. They are found especially in cases of chronic inflammation of the uriniferous tubes.

Waxy or hyaline casts are transparent, and, for this reason, without close attention, are liable to escape observation. They occur in acute parenchymatous nephritis and the cirrhotic kidney, but more especially in cases of chronic lardaceous, amyloid, or waxy disease of the kidney. Their size is considered to be of importance as denoting either the presence or the absence of epithelium in the uriniferous tubes; hence, they are divided into large, small, and medium-sized waxy casts. The largest measure $\frac{1}{500}$ of an inch in diameter; the smaller $\frac{1}{1000}$ of an inch.

Fatty casts are studded more or less thickly with oil drops. If abundant, they denote fatty kidneys.

Bloody casts either consist chiefly of blood-corpuscles, or the latter are adherent to their surface. They characterize the early stage of acute parenchymatous, tubal, or degenerative nephritis.

Casts containing pus-corpuscles are rare. They have been observed in cases of multiple abscesses in the kidneys.

The substratum of the purulent, bloody, and fatty casts is a coagulated material in the tubes. This is probably true of many of the granular and epithelial casts. The epithelial, granular, and waxy casts, of large or small size, are often found together in examinations of the urine. No one of the different varieties is diagnostic exclusively of any particular renal disease. The preponderance of either renders its presence significant. The abundance of casts is also to be considered with reference to the diagnosis.

Casts are sometimes present in urine which is not albuminous. They may then, in connection with the history and symptoms of the case, be of much importance as proof of the existence of renal disease. On the other hand, renal disease may exist without the presence of casts, so that their absence is not sufficient to exclude renal disease. It is rare, however, for casts to be persistently absent in cases of renal disease. Again, a few casts are found not infrequently when the urine is albuminous from mere congestion of the kidneys, in cases of inflammatory and febrile diseases, certain affections of the heart, etc. They occur not infrequently in cases of jaundice, and if the urine of a person apparently in perfect health be examined daily, now and then a cast may be discovered. Several specimens of urine obtained on different days should be examined for casts before forming a conclusion as regards the information derived from this source.

The sedimentary deposit in urine often contains epithelium from different sources, namely, the bladder, urethra, vagina, the pelvis of the kidneys, and from the uriniferous tubes. Those only from the last-named situation are of importance in the diagnosis of diseases of the kidney. Renal epithelium, the cells not notably altered, is found in sediment which contains epithelial casts, and may be present, in more or less abundance, without the latter. Granular matter, from the disintegration of renal cells, and cells filled with oil-drops, are varieties of epithelial deposit. The clinical significance of these three forms is the same as of the corresponding casts, namely, the epithelial, granular, and fatty.

Uræmia.

Insufficiency of the excretory function of the kidneys occasions a retention in the blood of excrementitious matter, especially urea. This morbid condition of the blood is called uræmia. Uræmia gives rise to various pathological effects, some of which endanger life, and others, in themselves, are not generally dangerous. Clinically, it is convenient to group these effects according to the distinction just stated. The minor pathological effects of uræmia are chiefly important as symptoms of the uræmic condition, and as foreshadowing often those effects which are attended with more or less danger. The graver are those liable to terminate life.

The minor effects are headache, defective vision, or amaurosis, impaired hearing, involuntary muscular twitchings, cramps, drowsiness, vomiting, and diarrhœa. The last two in this list are attributed to the vicarious elimination of urea by the gastro-intestinal mucous membrane. These may precede the graver effects, being thus the first manifestations of uræmia. The recognition, in individual cases, of the fact that they are uræmic phenomena, is of great importance. It happens not infrequently that, prior to the occurrence of some one or more of these effects, disease of the kidneys had not been suspected. With reference to an early diagnosis of the latter, therefore, their pathological relations are to be kept constantly in mind.

In uræmic headache, the pain may be referred to the forehead or vertex. It is not unilateral. The pain is not always severe, but in some cases it is notably intense. Bilateral headache, more or less intense and persistent, should always suggest the inquiry whether it be not connected with renal disease.

Sudden and complete loss of vision may either precede or follow uræmic coma and convulsions. The amaurosis sometimes occurs suddenly, and as suddenly disappears. Under these circumstances, the immediate causative condition is cerebral. The retina presents no appreciable alteration. More frequently the vision is more or less impaired, but not lost; the patient compares the difficulty to that of a mist before the eyes. The degree of the imperfection of vision varies from day to day, and sometimes from hour to hour. In these cases the ophthalmoscope reveals certain abnormal appearances of the retina (retinitis albuminurica). These appearances are distinctive of renal disease. "The ophthalmic physician, even while no physical sign of a general malady is present, is justified in inferring the existence of renal disease from the ophthalmoscopic appearances alone." Several instances have fallen under the author's observation, in which, from characteristic appearances of the retina, oculists, by means of the ophthalmoscope, have diagnosticated disease of the kidneys, the patients complaining of no other ailment than defective vision.[1]

Impaired hearing is a much rarer effect of uræmia than defect or loss of vision; but its occasional occurrence as an uræmic manifestation should not be overlooked.

Involuntary muscular twitchings, starting in sleep, and cramps of the lower limbs, are not uncommon in cases of uræmia. They should direct attention to the kidneys, although other and more frequent uræmic symptoms are wanting. Notable drowsiness sometimes precedes the graver cerebral effects of uræmia.

Uræmic vomiting is a not infrequent symptom. It is apt to occur when the stomach is empty as well as after the ingestion of food. It occurs sometimes in the morning before breakfast, and resembles, in this respect, the vomiting in pregnancy. The suddenness of its occurrence and its violence are somewhat characteristic. After an act of vomiting, patients sometimes are sensible of the taste and odor of ammonia, and this may be discoverable by chemical tests in the matter vomited. Frequently recurring or persistent vomiting should in all cases lead to an examination of the urine for evidence of renal disease. In some cases the vomiting is so persistent as to entitle it to be ranked among the graver effects of uræmia, death taking place from exhaustion and inanition.

---

[1] For a description of the ophthalmoscopic appearances, *vide* Ziemssen's Cyclopædia, American edition, Id. xv. p. 476; also, Diseases of the Kidneys, by W. Howship Dickinson, M.D., Part Second, Albuminuria, London, 1877.

Diarrhœa, which, like vomiting, denotes an effort for the vicarious elimination of urea, is also a not infrequent symptom, and may betoken renal disease when other uræmic manifestations are wanting.

Intense itching of the skin, without redness or an appreciable eruption, is an occasional symptom of uræmia. It is to be included among the minor manifestations which, in the absence of any of the other effects, should lead to an examination of the urine.

The graver effects of uræmia are coma and convulsions, which are sometimes followed by active delirium, acute œdema of the lungs, œdema of the glottis, nervous dyspnœa, hypertrophy of the heart, pericarditis and other inflammatory affections of serous structures.

Uræmic coma is usually foreshadowed by some of the minor manifestations of uræmia. As a rule, it is preceded by drowsiness, gradually increasing to somnolency, and ending in the comatose state. There are, however, exceptions to this rule. Instantaneous or apoplectic coma sometimes occurs without any premonitions or any prior symptoms denoting renal disease. In a case which came under the author's observation, the patient became suddenly unconscious while engaged in his usual occupations. Disease of the kidneys had not been suspected, but an examination of the urine showed its existence. He recovered from this attack, and, after a short time, all evidence of renal disease disappeared. Many months afterward he had another attack equally sudden and ending fatally.

The coma from uræmia, in most instances, is accompanied by convulsions, but the latter are sometimes wanting. The convulsions are epileptiform in character. They continue for a variable period; remissions and intermissions generally occur, the duration of the latter varying much in different cases. In a considerable proportion of cases, the convulsions recur, after intervals of moments or hours, until death closes the scene. On the other hand, coma and a series of convulsive attacks take place; the convulsions cease, consciousness returns, and a recurring attack may be deferred for weeks, months, or even years.

There is little room for doubt in regard to the diagnosis of uræmic coma when prior manifestations of uræmia have occurred, or the existence of renal disease has been ascertained by examinations of the urine. But it may happen that the occurrence of minor effects, if they have occurred, and the results of examinations, if they have been made, are unknown. These are cases of emergency; and it is vastly important, without much delay, to determine the character of the affection. If convulsions be associated with the coma, this fact serves to exclude an apoplectic seizure from cerebral hemorrhage or embolism, for these affections are rarely accompanied by convulsions. Moreover, apoplexy from hemorrhage or embolism in one hemisphere of the brain, is accompanied by hemiplegia, which is wanting in uræmic coma. Embolism of the basilar artery and meningeal hemorrhage, however, may not give rise to hemiplegia, and uræmic coma is not always associated with convulsions; hence there is a liability to error in discriminating between these affections. Uræmic coma, without any knowledge of the previous history, is also to be differentiated from alcoholic intoxication and narcotism. These two morbid conditions may be excluded by the absence of the diagnostic circumstances pertaining to each. Among these are the odor of the breath, vomiting, with the odor of alcohol in the matters vomited, in cases of alcoholic intoxication, and, in cases of narcotism, the contracted pupils, together with the notable infrequency of the respirations. In uræmic coma the pupils are more or less dilated. But, in order to render the diagnosis more positive, it is important at once to examine the urine for the presence of albumen; and, with reference to this point, a specimen of urine should be obtained by means of the catheter. If practicable, also, the specific gravity of the urine thus obtained should be ascertained. If the urine be albuminous and of low specific gravity, the coma is to be considered as uræmic, and is to be treated as such. Hysterical coma is excluded by the absence of those diagnostic characters which will be considered in connection with diseases of the nervous system. The coma which follows an epileptic paroxysm is excluded by the absence of the evidence that convulsions have preceded the coma, namely, the frothy saliva, with blood from wounding of the tongue or cheek, and the cyanotic appearance of the face, the latter symptom being wanting in the coma from uræmia. The author has met with an instance in which uræmic coma proving fatal was considered to be narcotism, the existence of renal disease not being known, and the coma following the administration of opium for the relief of diarrhœa. The fact of the duration of profound coma for nearly twenty-four hours before death, together with the condition of the pupils and the frequency of the respirations, excluded narcotism in this case.

The temperature of the body does not furnish a diagnostic feature of uræmic coma. The temperature in some instances is not raised, and it may fall below the normal minimum; but in other instances it is much raised, the rise sometimes reaching 105°. The rationale of this remarkable discrepancy is not understood. Generally, in uræmic coma, the patient lies in a quiet stupor. The respiration is rarely stertorous. As indicated by Addison, the respiratory sounds which are sometimes heard are labial rather than guttural. The rhythm of the respirations in some instances is much disturbed. The occurrence of long intervals between the respiratory acts, from time to time, is a form of disturbance, and what is known as the "Cheyne-Stokes respiration" sometimes occurs (*vide* page 70). The author has observed distinctly an urinous odor in the breath and in the perspiration of patients in an attack of uræmic coma and convulsions.

Uræmic coma and convulsions may be mistaken for epilepsy. The author has met with a case in which repeated attacks had been considered as epileptic. An examination of the urine gave evidence of renal disease, and the patient subsequently died in a recurrent attack. This error is to be avoided by examinations of the urine and attention to the minor effects of uræmia.

Acute œdema of the lungs is an occasional pathological effect which places life in danger. This effect sometimes occurs suddenly without preliminary pulmonary symptoms or any apparent exciting cause, increasing rapidly, causing great embarrassment of respiration, and ending fatally within a short time. It may occur without being preceded by general dropsy. In many instances, however, relief is procured by appropriate therapeutical measures. It is liable to recur after irregular intervals. The symptoms, diagnostic signs, and treatment have been considered (*vide* page 140).

Œdema of the glottis is another effect which may quickly destroy life, unless relieved by scarifications or tracheotomy (*vide* page 157).

Another of the grave effects is a dyspnœa which may be distinguished as nervous. It is independent of any pulmonary affection compromising the respiratory function. The patient suffers, in paroxysms, from a feeling of danger of the loss of breath. During a paroxysm, volition is requisite for the respiratory acts; the involuntary reflex influence is insufficient. The paroxysms occur especially in sleep; the patient is aroused and terror-stricken by a sense of suffocation, and is afraid to sleep again. Instances have fallen under the author's observation in which this form of dyspnœa occurred when the existence of renal disease had not been suspected. The dyspnœa evidently depends upon a morbid condition affecting the respiratory centre in the medulla oblongata. This is probably the effect considered by Bartels and Dickinson as denoting uræmic asthma.[1] That the dyspnœa is not asthmatic is shown by the absence of the dry bronchial râles which invariably accompany spasm of the bronchial muscular fibres.

Pericarditis, pleuritis, peritonitis, and cerebral meningitis, are diseases to which, in certain cases, uræmia stands in a causative relation. These diseases are considered in their appropriate nosological relations.

Treatment of Uræmia.

The object of treatment whenever any of the minor effects of uræmia are manifested, is, not merely to relieve these, but to forestall, if possible, the occurrence of the graver effects. In order to judge of the liability to the latter, examinations of the urine with reference to the amount of urea excreted, are important. The quantity of urine and the specific gravity are the data for determining this point of inquiry. But it is to be considered that the amount of urea excreted is by no means an infallible guide as regards the danger. If the accumulation of urea in the blood have taken place slowly, it may be tolerated in considerable quantity, whereas, if the retention be sudden, a moderate accumulation may occasion the grave effects of uræmia. Moreover, as regards the amount of urea in the blood, much depends on the degree of its vicarious elimination. Hence, it follows that the danger is not always to be estimated by the small quantity of urine and its low specific gravity. If, however, the amount of urea in the urine be but little below that of health, this fact affords, for the time being, an assurance of safety.

---

[1] *Vide* Ziemssen's Cyclopædia, Am. edition, vol. xv. page 111. Also, Diseases of *the Kidney*, by W. Howship Dickinson, part second, Albuminuria, London, 1877.

The measures for the prevention of the grave effects of uræmia are those which either increase its excretion by the kidneys or promote its vicarious elimination through the intestinal mucous membrane or the skin. If the indications be not urgent, diuretics should be first tried. Diseased kidneys often do not respond to this class of remedies. When these prove inefficient, hydragogue purgatives, or measures to excite perspiration, are to be resorted to. The saline purgatives (sulphate or citrate of magnesia, the bitartrate of potassa, or the bitter mineral waters) may be employed. The pulvis purgans is an eligible preparation. Judgment is to be exercised in carrying the use of these remedies sufficiently far to effect the requisite elimination, and not so far as to disorder unduly the digestive organs, or weaken the patient. In prescribing them one of two plans may be adopted according to circumstances in individual cases. One plan is to prescribe the hydragogue remedy after intervals of a few days; the other plan is to prescribe it daily in small doses so as to maintain a slight or moderate effect. Urea may be eliminated in considerable quantity by the skin. In a case of uræmic coma at Bellevue Hospital 32 ounces of perspiration were collected from the India-rubber cloth on which the patient lay while a hot-air bath was employed. This liquid, analyzed by Professor Doremus, yielded 20 grains of urea. The hot-air bath is the most efficient of the means of producing free perspiration. If the appliances be not at hand, the patient in bed may be surrounded with hot bricks or bottles of hot water. Wrapping the body in a sheet wet with water as hot as can be comfortably borne, and covering with dry blankets, is an efficient method. The jaborandi, from its remarkable power of diminishing arterial pressure, and thereby inducing copious perspiration, which has been found to contain urea in abundance, seems admirably adapted to cases of uræmia. It is questionable whether its perturbatory effects be not an objection as compared with the measures which act directly upon the surface. Its value is to be determined by further clinical experience. Some patients do not tolerate well the hot-air bath, and the skin does not favorably respond to the action of heat. The jaborandi may be found a valuable alternative in these cases. The remedy may be given in the form of infusion, fluid extract, or tincture. For its hypodermic administration a salt of the alkaloid (pilocarpina) is to be used. The hydrochlorate is the preferable salt. Squibb recommends the following formula: fifteen grains to a fluidounce of distilled water; half a grain of salicylic acid being added to prevent microscopic growths.[1] For patients not confined to the bed, the Turkish or Russian bath, if available, is well suited, repeated once or twice weekly. The Turkish bath is to be preferred.

The use of opium is considered by some inappropriate in cases of uræmia. It is supposed to favor the toxical effect of urea in the blood.[2] The author has been led by clinical observations to an opposite opinion. Certainly in some cases it favors the tolerance of the uræmic condition. Symptoms denoting an impending attack of coma and convulsions are relieved by it, and the occurrence of the latter seems to be warded off. If this drug be hurtful in some, it is assuredly not so in all, cases, but the effect is quite the reverse.

---

[1] Since this page was written, pilocarpina has been employed with good effect in a considerable number of cases under the author's observation.

[2] *Vide* Treatise on Albuminuria, by W. H. Dickinson.

When uræmic coma has occurred, the life of the patient may depend on the prompt and efficient employment of eliminative measures of treatment. Having made a positive or a highly probable diagnosis, no time should be lost in resorting to an active hydragogue cathartic. Of all the hydragogues, elaterium is best suited to such an emergency. Half a grain may be given at once, and repeated after an hour if the first dose have no effect. It is better to incur the risk of a needlessly great than not to secure a sufficient effect. If this remedy be not available, or, from lack of strength in the article, it fail to produce promptly copious watery stools, croton oil should be given. At the same time, diaphoresis should be produced by the agency of heat upon the surface. Of course, diuretics, under these circumstances, are useless. There are but few instances in the practice of medicine in which prompt action is called for more imperatively than in cases of uræmic coma. Inasmuch as the patient is in danger of immediate death, a tardy or inefficient treatment is a reproach; whereas, active treatment, employed at once, may be the means of saving life. The same efficient eliminative measures of treatment, promptly resorted to, are indicated in acute œdema of lungs, and in some cases of nervous dyspnœa. It is hardly necessary to add that the uræmic condition, when involved in the causation of pericarditis and other serous inflammations, furnishes important therapeutical indications.

During uræmic convulsions the inhalation of chloroform may be resorted to in order to restrain the violence of the convulsive movements. It has no efficacy beyond the palliation of these.

When the minor manifestations of uræmia are present, the diet of the patient should consist in a great measure of milk and farinaceous articles, animal food being taken sparingly. This, at least, is a rational indication, inasmuch as, in a certain degree, the urea in the blood is derived from the metamorphosis of the ingesta. Muscular exercise should be avoided in order to limit the amount of urea derived from the tissues.

THE DIAGNOSIS AND TREATMENT OF DISEASES OF THE KIDNEYS.

Of the diseases of the urinary system, those only which relate to the kidneys are properly embraced in this treatise. Diseases of the bladder, the prostate gland, and the urethra belong to surgery.

Enumerated in the order in which they will be taken up, the following list comprises the diseases of the kidneys, which, with our present knowledge, admit of clinical recognition. Certain affections are embraced under the name Bright's disease. They are generally characterized by the presence of albumen in the urine (albuminuria). One of these is that known as acute Bright's disease, acute albuminuria, acute parenchymatous, or diffuse nephritis, acute desquamative, or tubal nephritis—all these names denoting one and the same affection. Other affections are chronic parenchymatous, or diffuse nephritis; the affection called fibroid, cirrhotic, contracted, schlerotic or granular, and that called amyloid, lardaceous or waxy. The three last-named affections are collectively called chronic Bright's disease, or chronic albuminuria. Waiving here the discussion of the question whether the so-called fatty degeneration of the kidneys is to be considered as a distinct affection, that it cannot be clinically recognized as separate from other forms of disease, must be admitted. Undoubtedly it is often, if not generally, secondary to the other affections. The three chronic affections which will be considered as distinct, may be often differentiated, but not infrequently they are combined, constituting mixed forms of disease. Affections other than those embraced under the names acute and chronic Bright's disease, are suppurative nephritis and perinephritis; pyelitis and pyelonephritis; pyonephrosis and hydronephrosis; renal cysts with enlargement of the kidneys, renal cancer, hydatids and tuberculous disease; renal or nephritic colic; hæmaturia; renal congestion, and movable kidney. Finally, diabetes mellitus and insipidus, although, with strict nosological propriety, not belonging among the diseases of the urinary system, will, in conformity with usage, be considered in this section.

This section embraces only diseases of the urinary system. It does not include those affecting the genitalia, and the latter are not treated of in this work. The greater part of the diseases of the generative system in men are within the province of surgery; and the diseases of the female organs of generation are treated of in works on gynæcology. Morbid conditions relating to the sexual function and its abuses, enter into the etiology of different affections, more especially those of the nervous system. In this point of view, they are without the scope of this work. For the diagnosis and treatment of the very few affections which are exclusive of those treated of in surgical works, and works devoted specially to diseases of the genito-urinary system and to gynæcology, the reader is referred to treatises on the principles and practice of medicine.

Acute Parenchymatous Nephritis; Acute Tubal Nephritis; Acute Bright's Disease; Acute Albuminuria.

The pathological condition in the affection to which have been applied the several names given above, is inflammation of the secretory tubes of the kidneys. The affection is bilateral. Anatomically, the form of disease is the large white kidney. Local pathological effects which are represented by diagnostic morbid appearances relating to the urine, are, the presence of a coagulated, hyaline or waxy material in the tubes, an abundant shedding of epithelium and hemorrhage.

In a certain proportion of cases the inflammation is subacute, without lasting sufficiently long to constitute a chronic disease. Cognizance is to be taken of this fact, but no practical advantage would accrue from formally describing the subacute as distinct from the acute affection.

In the clinical recognition of this affection, aid is derived from our knowledge of its etiology. It occurs most frequently in childhood and youth, that is, after two years of age and under the adult period. It is rare after forty, and exceedingly so after fifty. In the great majority of the cases occurring in childhood, it is a sequel of scarlatina. It may be caused by the scarlatinous contagium without being preceded by scarlatina. Of this fact the author has met with a number of illustrations, the patients being adults, and in some instances having had scarlet fever in early life. It is sometimes developed during the progress of scarlet fever, but much oftener from two to three weeks after convalescence. Less frequently, but not very infrequently, it either accompanies or follows diphtheria. It is an occasional sequel of measles. It is a rare complication in cases of typhus and typhoid fever, erysipelas, smallpox, and pyæmia. It is a source of danger when reaction takes place from the stage of collapse in epidemic cholera. In a mild form it is incident to jaundice, diabetes mellitus, and acute rheumatism. After adult age, in the majority of cases, it is attributable to cold. In most hospital cases it may be distinctly traced to exposure, conjoined often with alcoholic intoxication; such as lying on the ground in a state of drunkenness. In a hospital case under the author's observation, it was attributable to an enormous indulgence in lager beer, the patient, with an associate, having obtained a barrel of lager beer, from which they drank almost continuously until the whole was consumed. It is an affection belonging especially to temperate climates, occurring very rarely in either a cold or a tropical latitude. It may be caused by the introduction into the system of certain substances which are specially irritating to the kidneys, such as turpentine, cantharides, and arsenic. Finally, pregnancy stands in a causative relation to it, the rationale not being fully understood.

General dropsy, and morbid conditions pertaining to the urine constitute the diagnostic features of the affection. Œdema of the face and lower limbs is usually an early symptom. The œdema, often within a short period, becomes generalized, and notable anasarca occurs. Anæmia generally coexisting, the puffy and pallid face is highly characteristic. A frequent desire to micturate is common, the quantity expelled with each act being small. The secretion of urine, as a rule, is much diminished. Aside from the quantity, the characters pertaining to the urine early in the disease are as follows: It is sooty or smoky from the presence of blood. In some cases, blood being present in larger quantity, it is distinctly bloody in appearance; the blood sometimes forms a coagulum at the bottom of the vessel, and, generally, a microscopical examination of the sediment shows blood globules more or less deformed and disintegrated. The specific gravity, while the quantity of urine is diminished, equals or exceeds the maximum of health. Albumen is almost universally present, and often in considerable or great abundance. The urine contains casts of different varieties, namely, epithelial, granular, large and small hyaline. The epithelial and small hyaline predominate, and their predominance is diagnostic. Blood globules and oil drops may be adherent to the casts. The sediment contains more or less renal epithelium, either unchanged or granular, and sometimes containing oil drops. There is more or less diminution of all the constituents of the urine, more especially urea and the chlorides. Complete suppression of urine occurs in some cases, the ending in these cases being often fatal.

This sketch of the diagnostic features applies to the early period in well-marked or typical cases. At a later period, especially in cases which progress favorably, the urine becomes abundant, the specific gravity falls below that of health, and is not infrequently quite low; the blood disappears; the albuminuria ceases; disappearance of the casts follows, and the dropsical effusions are absorbed. Exceptional deviations are the absence of dropsy and of albuminuria, the latter being much more infrequent than the former. Hæmaturia is not invariable. These deviations occur especially when the affection is developed during pregnancy.

Other symptoms than dropsy and those pertaining to the urine, vary much in different cases. In some cases, at the outset, the fever is high, independently of that due to affections with which the renal disease is associated. In most cases, however, the rise of temperature is moderate, and, during the progress of the affection, the body-heat may fall below the minimum of health. The difference in temperature is such that cases might be grouped as febrile and non-febrile. Pain in the loins is rarely a prominent symptom, and is often wanting. This statement also applies to tenderness on pressure over the kidneys. Anorexia, and general debility are pretty constant symptoms.

Cases differ in respect of the minor and the grave uræmic phenomena. In a large proportion of the cases which pursue a favorable course, none of the latter phenomena appear. In fatal cases death is preceded generally by uræmic coma, and convulsions; more rarely by pericarditis or pleurisy, and sometimes by œdema of the glottis, or pulmonary œdema. These grave pathological effects, in most instances, but not always, are foreshadowed by certain of the minor effects, namely, uræmic vomiting, headache, and muscular twitchings. Sudden loss of vision (amaurosis uræmica) is an occasional event, the morbid causative condition being cerebral. If the progress of the disease be favorable, vision is regained, perhaps as suddenly as it was lost. Impairment or loss of vision from retinal changes (retinitis albuminurica) occurs rarely in this affection; it belongs to the history of the chronic affections. In this, as in the other forms of renal disease, the liability to the grave uræmic effects is to be estimated by the occurrence of the minor manifestations, and by the deficiency of urea in the urine, as shown by its diminished quantity. Suppression of urine is always attended by imminent danger. The grave effects, although always alarming, are by no means necessarily fatal.

The difficulty in the diagnosis is the differentiation of this affection from chronic parenchymatous nephritis. The distinctive points are the connection of the affection with the causes which have been enumerated, the smoky or bloody urine, together with the abundance of epithelial casts and of renal epithelium in the urinary sediment. At the outset of the affection, these diagnostic points render the diagnosis easy. The urinary characters, however, after a time disappear, and, without the knowledge of their having existed, it is difficult to decide against the chronic form of the disease. There are cases in which the diagnosis cannot be made with positiveness until the character of the affection is shown by the recovery of the patient. Moreover, in a small proportion of cases, the affection persists and becomes chronic. The evidences of renal disease sometimes persist for many weeks, and even many months, recovery at length taking place. In these cases it is proper to consider the affection as having become chronic. Knowledge of the fact that the points distinctive of an acute affection existed at the outset, is important with reference to the prognosis; the prognosis is rendered thereby favorable. In the great majority of cases, the affection does not become chronic, and ends in recovery after a few weeks. The fact that recovery is not only possible, but highly probable, distinguishes acute parenchymatous nephritis from the several affections embraced under the name chronic Bright's disease.

Treatment of Acute Parenchymatous Nephritis.

With reference to treatment, the sources of danger are to be kept in mind. These are general dropsy, and the grave effects of uræmia, namely, coma and convulsions, pulmonary œdema, œdema of the glottis, pericarditis, pleuritis, and other serous inflammations.

General dropsy is very rarely the immediate cause of death, but it may contribute to a fatal termination by inducing exhaustion, and interfering mechanically with important functions, more especially respiration and alimentation. The direct measures indicated are those which eliminate water from the blood; of these, hydragogue cathartics are the most reliable and potential. If the indication be urgent, elaterium is by far the most efficient remedy. Milder, but nevertheless efficient, hydragogues are the compound jalap powder (pulvis purgans) and the sulphate of magnesia. As a rule, but little reliance is to be placed on diuretics or sudorific measures for fulfilling this indication. For further practical points the reader is referred to the treatment of dropsy as considered in a former part of this work (*vide* page 189).

The premonitions of the grave effects of uræmia are to be carefully and constantly watched for. They are the minor uræmic manifestations, together with the quantity and specific gravity of the urine. The grave effects are to be warded off by the timely and judicious employment of diuretics, the milder hydragogues, and the hot-air bath. These measures are, as far as possible, to be adjusted to the amount of apparent danger. They should not be actively employed, nor persisted in too long. Harm may be done by overdoing in these regards. The important point is the adaptation of the treatment to the indications.

When the urine is notably diminished, much may sometimes be accomplished by the introduction of water into the system. In a hospital case under the author's observation, the urine was nearly suppressed, and the irritability of the stomach was such that all remedies were immediately rejected. The hot-air bath was not well borne. Diuretics and hydragogue cathartics were out of the question. Under these circumstances a little water was given every few minutes during day and night. The kidneys soon began to resume their function, and under this treatment alone there was rapid and progressive improvement. The patient in a short time left the hospital perfectly well. The renal affection in this case occurred in pregnancy, the dangerous condition supervening upon premature delivery. The treatment was instituted and carried out by Dr. James L. Perry, at that time one of the house physicians in Bellevue Hospital. Other cases which the author has since observed, have exemplified the efficiency of this simple treatment.

The treatment of uræmic coma and convulsions has been considered among the observations preliminary to this section (*vide* page 414); and for the treatment of other grave effects, namely, pulmonary œdema, œdema of the glottis, pleuritis, pericarditis, and peritonitis, the reader is referred to the consideration of these affections in their appropriate nosological places. Aside from the treatment indicated by the premonitions of danger from the sources referred to, the objects are palliation and prevention of the chronic affection. Active measures are not called for. Prudence requires that the patient should keep the bed in order to secure an uniform temperature, and to maintain the functions of the skin. In addition, the avoidance of exercise is useful by limiting the production of urea. The diet should be nutritious, but consisting chiefly of milk and farinaceous food, thereby avoiding an over-production of urea from the ingesta. Pure water should be taken as freely as it is well tolerated, with a view to its diuretic effect. Carbonated water and lemonade are well suited for drink. In the way of diuretic remedies, digitalis and a solution of the bitartrate of potassa are well suited to most cases. The irritating diuretics are not to be prescribed, but those which act without causing irritation of the kidneys are useful by promoting the removal of the epithelium and casts which obstruct the uriniferous tubes. Dry cupping over the loins and emollient applications are probably useful. The bowels should be kept open by mild salines. Patients being generally anæmic, chalybeates are indicated.

During convalescence, and for some time after recovery, judicious restrictions should be enjoined in regard to the use of alcoholics, excesses in diet, over-exercise and exposure to cold. It is the part of prudence to consider the kidneys as in a weakened, susceptible state, rendering them liable to take on disease which may become chronic.

CHRONIC PARENCHYMATOUS NEPHRITIS. CHRONIC INTERSTITIAL NEPHRITIS. WAXY DEGENERATION OF THE KIDNEYS.

These three affections, pathologically and anatomically distinct, are embraced under the names chronic Bright's disease and chronic albuminuria. They may often be differentiated clinically, and, therefore, with reference to diagnosis, they claim distinct consideration. The general principles of treatment find their application in each, and, in this respect, they may be considered collectively. It is easy to determine the existence of a chronic affection of the kidneys. The only difficulty relates to the discrimination from each other of the different forms of chronic disease. In considering them separately, therefore, the points involved in the differential diagnosis will chiefly claim attention.

Chronic Parenchymatous Nephritis.

Some writers treat of the acute and the chronic form of this affection under the same heading (Dickinson, Jaccoud). This plan is not adopted in this work for the reason that, from a clinical standpoint, there is a well-defined distinction between them. The acute form is generally recognized without difficulty if observed from the outset, and it rarely eventuates in the chronic form. As has been stated, there are cases in which the affection lacks the characters of acuteness, ending in recovery without becoming chronic; and, for the sake of convenience, these cases are included among those which are manifestly acute. Were strict propriety observed, these cases of mild or subacute inflammation which do not become chronic, should be considered separately. The reason for not doing so is that, practically, it is not important. The name catarrhal nephritis is sometimes applied to certain of these cases. This seems to the author unnecessary, and, moreover, it is desirable to avoid the use of the term catarrh. With this explanation, chronic parenchymatous nephritis will embrace all cases in which inflammation of the uriniferous tubes persists beyond a certain period, that is, for many weeks. The term will include cases in which, after months or even years, recovery takes place; but, in the majority of cases, the affection is permanent. It follows, from what has just been stated, that chronic parenchymatous nephritis is rarely preceded by a truly acute affection, but the inflammation is from the first subacute. Cases in which an acute precedes the chronic inflammation are, for the most part, those in which the affection was developed in pregnancy, or been induced by exposure to cold. It may be added that, when the chronic does not follow the causes which have been named as giving rise to the acute affection, our present knowledge of the causation is imperfect.

Chronic parenchymatous nephritis may be inferred whenever the acute affection becomes chronic. It is, however, to be assumed that a chronic affection did not precede an attack of acute parenchymatous nephritis, for the latter may be developed secondarily in connection with either of the chronic forms of renal disease. If chronic disease have existed for months or years before patients come under observation, to decide from the previous history whether or not it was preceded by an acute affection may be difficult or impossible. The inference in these cases, that the chronic disease is a parenchymatous nephritis, may be drawn from the fact that it followed exposure to cold, pregnancy, scarlatina, or some one of the essential fevers.

Irrespective of evidence from the etiology, the points which are diagnostic are as follows: The affection occurs chiefly in children and young subjects; persons in middle life are rarely affected with this form of chronic disease. Albuminuria always exists, and the amount of albumen in the urine is large or abundant. General dropsy is pretty uniformly present, and the amount of dropsical effusion is usually large. If acute nephritis have not preceded, œdema of the face and limbs is generally the first symptom to awaken the anxiety of the patient. Anæmia is marked. Notable anasarca and anæmia combined, point to this form of chronic disease. A presumptive diagnosis may often be based on the physiognomy of the patient. Assuming the disease to be chronic, a glance at the facies, by a practised eye, may be sufficient for the discrimination of this form of disease from the other chronic affections. The urine contains casts of the different varieties in abundance. The granular and large hyaline predominate in proportion as the affection has been of long standing. Fatty casts are not infrequent. Loose degenerated epithelium and some leucocytes are contained in the urinary sediment. The quantity of urine and the specific gravity vary in different cases and at different periods in the same case; the quantity is oftener diminished than increased, and the specific gravity is not notably low. The minor and the grave uræmic phenomena occur in a certain proportion of cases, especially when the disease is advanced. They occur, however, less frequently than in the other forms of chronic disease. It is not uncommon for a fatal termination to take place without any uræmic manifestations.

After a considerable or long duration, the diagnostic features of the affection may become less marked, so that, judging from existing symptoms, it is not easily differentiated from chronic interstitial nephritis or waxy disease of the kidneys. The diagnosis must be based on the antecedent symptoms and the etiology. Atrophy of the kidneys has taken place in these cases. The pathological effects of uræmia are then more likely to occur than previously.

Chronic parenchymatous nephritis differs from the other forms of chronic disease as regards prognosis; in a certain proportion of cases it ends in recovery. The proportionate number of cases having this ending will depend on the latitude given to the term acute. If an acute affection which ends in recovery after several months be not considered as having become chronic, the cases which recover will be comparatively few. Following the rule adopted in other diseases, these should be included among the chronic cases. But of the cases which are not preceded by the acute affection, a small proportion end in recovery. The longer the disease continues, the more unfavorable is the prognosis. The impossibility of recovery involves atrophy either with or without the occurrence of interstitial nephritis. Notable improvement approximating apparently to complete recovery is not infrequent. As an illustration of this fact, a patient had acute parenchymatous nephritis developed in connection with pregnancy. It was accompanied by much general dropsy. Under treatment, the dropsy disappeared. Albuminuria, which had been great, nearly ceased, and the general condition denoted perfect health. The patient, indeed, declared that her feeling of health was better than prior to her illness. After the lapse of about two years, dimness of vision occurred. This was the first evidence of uræmia. Following this, within a brief period, were coma and convulsions, which proved fatal.

The duration in fatal cases is exceedingly variable, the limitations extending from a few months to many years.

CHRONIC INTERSTITIAL NEPHRITIS.

The name interstitial nephritis is chosen from the various terms by which this form of chronic renal disease is designated, to wit, granular, contracting, fibroid or fibrous, cirrhotic, sclerotic, and gouty. Contrasted with chronic parenchymatous nephritis, it has points of difference by which it may in many, if not most, instances be discriminated.

In respect of etiology, it differs in the period of life when it is most likely to occur. It very rarely occurs before the middle age, whereas parenchymatous nephritis is especially a disease of early life. It is rarely attributable to the several causes to which the latter affection may be in most cases referred; and it differs in the absence of any positive knowledge of its causation. Its development imperceptibly, as regards symptoms pointing to its existence, is characteristic. If examinations of the urine be made in old cases of obscure or indefinite ailments, it may be found when there were no special grounds for even suspecting that it existed. When discovered, it had probably existed for a greater or less period. It is liable to be overlooked unless repeated examinations of the urine be made.

Of the three chronic affections, this, more frequently than either of the others, gives rise to uræmic phenomena. These phenomena may be the first to suggest an interrogation of the urine with reference to a renal affection. Either cephalalgia, vomiting, or disturbance of vision often leads to its detection. Instances have repeatedly fallen under the author's observation, in which patients have consulted an oculist, who, by means of the ophthalmoscope, has found either retinal hemorrhage or uræmic retinitis, when it had not been deemed important to seek advice from a general practitioner. In not a few instances some one of the grave uræmic effects, namely, coma and convulsions, pericarditis, pleuritis, pulmonary œdema, or œdema of the glottis, and nervous dyspnœa, takes place without having been preceded by any of the minor manifestations of uræmia, and when the existence of disease of the kidneys was previously unknown. Patients may have been unaware of any serious impairment of health prior to these effects. It is in cases of this form of chronic renal disease that sudden or apoplectic coma is liable to occur, and the fact of its being uræmic is to be ascertained by obtaining urine by means of the catheter, and testing it for albumen in order to determine the existence of renal disease.

Another point of difference from the chronic disease which has been considered, relates to general dropsy. Much general dropsy is exceptional, and it is often wanting. Œdema of the glottis and pulmonary œdema, however, occur oftener in this affection than in chronic parenchymatous nephritis. These local manifestations may occur when there is no general dropsy.

In the urinary changes there are notable points of contrast. Albuminuria is wanting in some cases, and when albumen is present in the urine, as a rule it is moderate or small in quantity. The amount of urine oftener exceeds than falls below the average of health. The amount is sometimes very large. The specific gravity is low, denoting a deficiency of urea. It varies from 1.015 to 1.007. Diminution of the amount of urine, and even suppression, are liable to occur at a late period in the progress of the disease, associated with uræmic effects. The tubular or cylindrical casts are less abundant, but they are generally present. The varieties which are in a measure diagnostic are the granular and the large hyaline or waxy. With reference, however, to casts, the quantity of albumen and general dropsy, it is to be borne in mind that parenchymatous nephritis, as a secondary or intercurrent affection, in cases of interstitial affection, is of not infrequent occurrence; and when the two affections are thus combined, the points of contrast in these respects are wanting. On the other hand, it is also to be borne in mind that a primary parenchymatous nephritis may become complicated with, or eventuate in, interstitial nephritis.

Simple hypertrophy of the left ventricle of the heart, that is, hypertrophic enlargement without valvular lesions, is symptomatic especially of this form of renal disease. It is vastly more frequent in this affection than in the other forms of chronic disease of the kidneys. It is a pathological effect in a considerable proportion of the cases of interstitial nephritis. In fact, simple hypertrophy of the left ventricle is so rare except as an effect of renal disease, that it is always to be regarded as presumptive evidence of the existence of the latter.

Cerebral hemorrhage, epistaxis, sometimes hæmatemesis, and occasionally purpura, probably dependent, measurably, on cardiac hypertrophy, are events which belong to the clinical history of the affection under consideration.

The duration of chronic interstitial nephritis is exceedingly variable. It may continue many years. It is not incompatible with fair general health. Uræmia, which is so constant in the parenchymatous affection, may be but little marked or wanting. The grave uræmic effects are the events which betoken danger, and, with reference to the treatment and the prognosis, these, together with the deficient elimination of urea as shown by the diminished amount of urine and the low specific gravity, claim careful attention. In the great majority of cases the immediate cause of death is uræmic coma, either with or without convulsions. In a minority of fatal cases the fatal termination is due to pericarditis, cerebral hemorrhage, nervous dyspnœa, and œdema of the lungs or glottis.

Waxy Disease of the Kidneys.

The term waxy is generally employed in this country to designate this form of renal disease, instead of the terms lardaceous or amyloid. The clinical differentiation from the two forms of chronic disease which have been considered, is, in most cases, practicable.

The etiology furnishes important diagnostic evidence. To the waxy form of disease, pneumonic phthisis, constitutional syphilis, prolonged suppurative inflammation in some parts of the body, and especially caries or necrosis of bone, stand in a causative relation. It may be traced to some one of these causes in the great majority of cases. Hence, a chronic renal disease which is found in these connections is presumably waxy. It may occur at any period of life between the ages of five and seventy years, but is most frequent between twenty and thirty years. In this respect, as well as in its causative connection with the diseases which have been named, it differs from parenchymatous and interstitial nephritis.

A fact which aids in the diagnosis is its frequent coexistence with waxy disease of the liver, spleen, and alimentary canal, either singly or collectively. The disease of the liver and spleen often causing enlargement of these organs, its waxy character may be determined by palpation (*vide* pages 379 and 409).

The comparative symptomatic characters are as follows: The quantity of urine early in the disease is increased, but rarely, if ever, is the increase as great as in some cases of interstitial nephritis. At a later period the quantity falls to the normal average or below it, but rarely is reduced as much as in some cases of interstitial nephritis. Albuminuria, which may be wanting at first, occurs sooner or later, but, until a late period, the amount of albumen is small, often consisting of only a trace. The specific gravity is low, and not infrequently notably diminished. Casts are almost invariably found. They are chiefly of the hyaline variety, of large and small size, the latter usually predominating. Fatty epithelial cells attached to the casts are not uncommon. Œdema of the lower limbs occurs sooner or later, and general dropsy is slowly developed, but, as a rule, not to that degree which is usual in parenchymatous nephritis. If the liver be affected, the peritoneal dropsy will be likely to be out of proportion to the anasarca and the pleuritic effusion. Unlike many cases of interstitial nephritis, this affection is generally accompanied by anæmia, and a notably cachectic aspect.

The waxy disease, much less frequently than interstitial nephritis, gives rise to the minor and grave effects of uræmia. It does not give rise to cardiac hypertrophy, nor to cerebral hemorrhage. Vomiting and diarrhœa, which are prominent symptoms in some cases, denote coexisting waxy disease of the stomach and intestinal tube.

The fatal termination in many cases of waxy disease, is attributable, in a great measure, or chiefly, to the same pathological condition seated in other organs, or to the diseases which stand in a causative relation to the renal affection.

The distinctive characters of waxy disease are liable to be obscured by the supervention of parenchymatous nephritis. This is of more frequent occurrence than in cases of interstitial nephritis.

Treatment of Chronic Parenchymatous Nephritis, Interstitial Nephritis, and Waxy Disease of the Kidneys.

In each of these affections, more especially parenchymatous nephritis, general dropsy may furnish therapeutical indications, which have been considered (*vide* page 189). Highly important indications pertaining to uræmia in each, more especially interstitial nephritis, have been considered (*vide* page 414). Aside from these two sources of indications, the objects of treatment relate to palliation and tolerance.

Palliative measures are indicated by vomiting, diarrhœa, deficient appetite, impaired digestion, anæmia, cephalalgia, vigilance, dyspnœa, etc. They are to be governed by the varying circumstances in different cases, and at different periods in the same case. As regards the symptomatic indications falling under this head, the general statement just made will suffice.

In respect of tolerance, it is to be stated that in a large proportion of the cases of parenchymatous nephritis, and in all the cases of interstitial nephritis and of waxy disease, curative treatment is out of the question. Recovery is impossible. All that the practitioner can hope to accomplish is to prolong life, in other words, to enable patients to tolerate the diseases as long and as well as possible.

An important negative injunction is to avoid measures which conflict with tolerance when they are not needed. Hydragogue purgatives and diuretics are not to be employed when not indicated either by dropsy or uræmia, and they are not to be pushed beyond the requirements for their use. They are sometimes given too much as a matter of course. It is to be borne in mind here, as in the treatment of other diseases, that tolerance may be promoted as much by avoiding measures which diminish it, as by those which contribute to its increase. A small or moderate degree and extent of general dropsy does not claim potential measures, and so long as a sufficient quantity of urea is eliminated by the kidneys, there are no indications for active treatment to prevent its undue accumulation in the blood.

Tolerance is directly promoted by proper alimentation, the judicious regulation of habits of life as regards exercise, etc., and fulfilling indications which relate to complications, associated affections, or disordered functions. The diet should be nutritious, and adapted to the digestive powers. If there be danger of uræmia, the farinaceous and fatty articles should predominate over those which are rich in nitrogenized principles. Alcoholics are to be used with circumspection, and, as a rule, very moderately. The temperature and functions of the skin are to be maintained by warm clothing. The warm bath is useful. If available, the Turkish bath may often be employed with advantage once or twice weekly. A certain amount of muscular exercise is useful by increasing nutrition, and exciting the functions of the skin.

The bichloride of mercury has been much used in this city in the different forms of chronic Bright's disease. Whenever useful, it is probably either as a tonic remedy, which it is proven to be by its increasing the red globules of the blood, or as a remedy against syphilis. Bartels advocates the iodide of potassium in cases of interstitial nephritis and waxy disease, given to the extent of from twenty to thirty grains daily.

In the waxy form of disease, an essential part of the treatment relates to the morbid conditions which are causative, namely, phthisis, syphilis, suppurative inflammation, and diseases of the bones.

In cases of interstitial nephritis occurring in a changeable, humid climate, patients may be advised to try change of climate, if it can be done without infringing upon the requirements of comfort, and if the disease be not far advanced. In mild, equable, and dry climates this form of renal disease prevails less than in climates which lack these qualities; it is, therefore, a rational inference that the disease is less likely to progress in the former than in the latter. When a long sea-voyage can be taken with convenience and satisfaction, it will be likely to prove useful, as in many other chronic affections.

Although incurable, the renal affections which are embraced under the name chronic Bright's disease, may be tolerated many years, indeed, indefinitely. Hence, judicious treatment may be of incalculable value, albeit recovery is not to be hoped for.

SUPPURATIVE NEPHRITIS AND PERINEPHRITIC ABSCESS.

The symptoms and events which pertain to suppuration taking place in the cortical portion of the kidney, and in the connective structure which surrounds the organ, are in a great measure similar. For this reason it is by no means always easy to differentiate these two affections, whereas they may often, if not generally, be differentiated from suppurative inflammation of the pelvis of the kidney (pyelitis and pyonephrosis), and from the accumulation of urine within this cavity (hydronephrosis). It is for these reasons that suppurative nephritis and perinephritic abscess are considered under one heading.

Excluding the cases of embolic abscess in which the accumulation of pus is not large, together with the cases of pyæmia in which numerous small purulent collections are found in the kidneys (metastatic abscesses), and also the cases in which pyelitis leads to suppuration within the cortex, suppurative nephritis is extremely rare.

In the great majority of cases the affection is unilateral. The essential diagnostic points are more or less pain and tenderness in the region of the kidney, enlargement of the organ, and, following these, the sudden appearance of a considerable quantity of pus in the urine. These points render the diagnosis vastly probable, but not absolutely certain, because an abscess which is not renal, but in the neighborhood of the organ, may open into the pelvis of the kidney or the bladder. Pyelitis, as a primary affection, is excluded by the fact that the local pain and tenderness, with enlargement of the organ, precede the pyuria. The chief difficulty is in excluding perinephritic abscess. The differential points relating to the latter will be presently stated.

Suppurative nephritis may be acute or chronic. In the acute form the local pain and tenderness are more marked; the inflammation commences with a chill, and continuous fever follows, which is sometimes of a high grade. The disease may run a rapid course, terminating fatally within a brief period. The inflammation may be at first acute, and become chronic, but more frequently it is from the first subacute, the local and general symptoms being comparatively slight.

When the inflammation has a traumatic origin, that is, caused by penetrating wounds or contusions, hæmaturia precedes the appearance of pus in the urine. In chronic traumatic cases the urine may contain blood for a considerable period.

In the foregoing account it is assumed that the renal abscess opens into the pelvis of the kidney. This is the rule. It may, however, open into the connective tissue around the kidney behind the peritoneum, into the peritoneal cavity, into the colon; and cases have been reported in which the pus has made its way through the diaphragm into the pleural cavity, or the bronchial tubes. Opening in the first of these several directions, perinephritic abscess follows. Fatal peritonitis results from the evacuation of the pus into the peritoneal cavity. The discharge of pus from the bowels follows the opening into the colon, and this, next to the pelvis of the kidney, is the most favorable direction. Empyema, proving fatal, is the result of the opening into the pleural cavity, and a copious expectoration of pus denotes perforation of the lung and the discharge into the bronchial tubes. In all these instances the diagnosis is to be based on the localization of pain, tenderness, and enlargement prior to the evacuation of the abscess. The author has reported a case in which an enlarged left kidney formed a fluctuating tumor in the lumbar region, which was opened, and a quart of pus escaped. An opening into the peritoneal cavity subsequently took place, causing fatal peritonitis. In place of the kidney, was a membranous sac, the substance of the organ having been completely destroyed. The history in this case showed that the phlegmonous inflammation had its origin in the cortex.[1] Cases have been reported of renal abscess opening externally and ending in recovery.

The diagnosis of embolic and pyæmic abscesses can only be made conjecturally.

Perinephritic abscess, when not connected with either suppuration in the kidney (renal abscess) or with pyelitis, or with both (pyelonephritis), is differentiated by the following diagnostic points: In the majority of cases it forms a tumor in the lumbar region on one side; the tumor is preceded and accompanied by local pain and tenderness, together with more or less fever and constitutional disturbance, as in cases of renal abscess. The tumor advances toward the surface, after a time giving the sense of fluctuation, and opening externally. The pus may have a fecal odor from the diffusion of intestinal gas. On the other hand, a renal abscess pursues this course exceptionally. A renal abscess opens, as a rule, into the pelvis of the organ, whereas this is of very rare occurrence in cases of perinephritic abscess. Hence the sudden appearance of an abundance of pus in the urine, after pain with tenderness in the lumbar region, chills, fever, etc., have existed for a considerable period, is evidence *for* renal, and *against* perinephritic abscess.

---

[1] *Vide* Principles and Practice of Med., 4th edition, page 796.

Renal abscess impairs or arrests the functional capability of the affected kidney, and the quantity of urine is therefore diminished. A perinephritic abscess does not have this effect.

Perinephritic abscess may be secondary to suppurative nephritis, and the latter may have been caused by pyelitis or pyonephrosis. Under these circumstances there is, of course, no room for a differential diagnosis.

The pus in perinephritic, as in renal, abscess may be evacuated into the peritoneal cavity, the colon, and either the pleural space or the bronchial tubes.

Both renal and perinephritic abscess are to be differentiated from affections which give rise to pain and tenderness in the lumbar region, and from other diseases of the kidney giving rise to a tumor in that region. Myalgia and lumbar neuralgia are unattended by fever or much constitutional disturbance; and, moreover, they have their own diagnostic features. The renal affections which may give rise to tumor are pyonephrosis, hydronephrosis, and cancer. These affections will presently be considered with reference to their diagnostic characters.

Treatment of Suppurative Nephritis and Perinephritic Abscess.

A tumor in the lumbar region, preceded or accompanied by symptoms pointing to the latter of the two affections, should be explored by means of a hollow needle or small trocar, and aspiration employed in order to determine whether it be an abscess. If pus be obtained, it should be evacuated by making a free opening. The opening should be maintained, and the cavity of the abscess injected with tepid water containing a little carbolic acid. This treatment applies chiefly to perinephritic abscess, inasmuch as the diagnosis of renal abscess hinges on the evacuation of the pus into the pelvis of the kidney, and, when this has taken place, an external opening is rarely required.

Aside from this surgical measure, the treatment of both affections relates to symptomatic indications and support. Absolute rest is important, especially in cases of perinephritic abscess, with a view to guard, as far as possible, against rupture into the peritoneal or the pleural cavity. An early opening by incision is advisable in order that these accidents may be avoided.

PYELITIS. PYELONEPHRITIS. PYONEPHROSIS. HYDRONEPHROSIS.

In pyelitis, the inflammation is seated in the pelvis and calyces of the kidney. If, as is frequently the case, the inflammation extend to the interstitial tissue of the kidney, the affection is called pyelonephritis. The supervention of the latter affection may be surmised, but it cannot be clinically established; hence there would be no practical advantage, with reference to diagnosis and treatment, in considering it as distinct from pyelitis. The term pyonephrosis denotes distension of the pelvis of the kidney with pus, in consequence of an obstruction to its passage through the ureter into the bladder. It is, therefore, incident to the *foregoing* affections. In hydronephrosis, the urine accumulates in the pelvis of the kidney in consequence of an obstruction at some point in the urinary apparatus. The affection is not, therefore, of necessity inflammatory, but it is liable to lead to pyelitis and pyelonephritis.

The causes of pyelitis are to be considered in the diagnosis and treatment. The most frequent of the causes are the presence of urinary concretions or calculi in the pelvis of the kidney, and the retention of urine which becomes ammoniacal. Arising from the first of these causes, the affection is generally unilateral; from the second, it is often bilateral. It occurs occasionally in cases of the essential fevers, pyæmia, diphtheria, cholera, scorbutus, and diabetes mellitus. It may be caused by cantharides and other irritating diuretics. The opinion held by Klebs and others that the affection is sometimes caused by bacteria which, introduced into the bladder by the use of catheters not properly cleansed, migrate into the pelves of the kidneys, if correct, is of obvious practical importance. It is certain that, in cases of cystititis, the inflammation advances not infrequently from the bladder to the pelvis of the kidney.

The diagnostic symptoms of pyelitis are local pain or uneasiness referable to the lumbar region on one side or on both sides; the presence of pus in the urine, with mucus and sometimes a little blood, together with epithelial cells from the pelvis of the kidney. The pus does not appear suddenly in more or less abundance, as in cases of renal abscess opening into the pelvis of the kidney; at first small in quantity, it gradually increases, rendering the urine opaque, and subsiding to the bottom after a specimen has been allowed to remain undisturbed. The urine, if there be no obstruction, generally gives an acid reaction. The quantity of urine is increased prior to an invasion of the substance of the kidney, and provided there be not pyonephrosis. After the affection has existed for some time, the epithelial cells are no longer found in the urine.

Pyelitis is attributable to calculi (calculous pyelitis) when it is preceded or accompanied by attacks of pain caused by the passage of calculi from the pelvis of the kidney to the bladder (*vide* Renal or Nephritic Colic), especially if the inflammation be unilateral and on the same side as the colic. It is attributable to the retention of urine when there is obstruction from an enlarged prostate, stricture of the urethra, or other causes. Under these circumstances, the accumulation in the pelves of the kidneys presupposes distension of the bladder. If cystitis exist, it is not always easy to determine the coexistence of pyelitis. The diagnosis is to be based on the presence of lumbar pains, the abundance of pus in the urine, the amount of constitutional disturbance, and, perhaps, uræmic phenomena.

That the pyelitis is unilateral may be inferred from the localization of pain or uneasiness on one side, and by the occurrence of renal colic on the same side. The correctness of this inference is proven if there occur periods during which the pyuria disappears, the urine becoming normal but diminished in quantity, together with an increase of lumbar uneasiness; these periods followed by a sudden increase in the quantity of urine, the reappearance of pus, and relief of the lumbar uneasiness. The explanation is a temporary obstruction of the ureter on the affected side.

Pyonephrosis, the accumulation of pus not being sufficient to cause a tumor on one or both sides, recognizable by palpation, is an important factor in producing atrophy of the renal parenchyma and pyelonephritis. If bilateral, uræmic effects occur, provided life be not destroyed by exhaustion. From complete or great obstruction of the ureter on one side, the accumulation may give rise to a tumor which cannot be differentiated from that caused by renal or perinephritic abscess. The differentiation involves the diagnosis of pyelitis anterior to the development of the tumor. The pus may be evacuated in different directions, the same as in cases of perinephritic abscess.

Hydronephrosis, that is, the accumulation of urine without pyelitis, is an effect of obstruction seated either in the ureter or in some portion of the urethra. If the obstruction be in the urethra, as from an enlarged prostate, stricture, or phimosis, the affection is bilateral. It is unilateral if the obstruction be seated in one of the ureters. The hydronephrosis leads to atrophy of the renal parenchyma, and, sooner or later, if bilateral, uræmia is the consequence. If unilateral, the renal parenchyma may be destroyed by atrophy, and a tumor may be produced which sometimes attains to an enormous size. It is liable to be confounded with an ovarian cyst. Experienced ovariotomists have been lead into this error.[1]

A tumor of greater or less size caused by hydronephrosis, as compared with a tumor caused by pyonephrosis, is indolent, that is, attended with little or no pain and tenderness. It produces inconvenience chiefly by displacing or pressing upon the abdominal organs. It occasions little or no constitutional disturbance so long as it does not lead to uræmia. It is not preceded nor accompanied by the evidences of pyelitis. If unilateral, and the obstruction of the ureter be caused by a calculus, the symptoms of renal colic will have occurred. The differentiation from pyonephrosis, and also from an ovarian cyst, may be made by means of an exploring puncture if the tumor extend toward the umbilicus. In hydronephrosis the liquid contains generally urea and uric acid, together with the alkaline and earthy urinary salts. If an exploratory puncture be made, care should be taken to avoid the colon which is situated between the tumor and the abdominal wall.

In cases of unilateral hydronephrosis, the unaffected kidney takes on an increased functional activity, so that the quantity of urine may not fall below that of health. The character of the affection is demonstrated if, from time to time, there be a sudden increase of the quantity of urine, and, coincident therewith, the size of the tumor be diminished. The explanation is a temporary removal or lessening of the obstruction.

Treatment of Pyelitis, Pyonephrosis, and Hydronephrosis.

Pyelitis when incident to the essential fevers, or other general diseases, is to be treated by rest, external fomentations, bland liquids in abundance in order to dilute the urine, opium to relieve pain, and such other remedies as may be called for to meet symptomatic indications. A favorable prognosis is admissible in these cases. If the inflammation become chronic, turpentine, the balsam of copaiba, eucalyptus, and cantharides may be of use. These remedies, given with a view to their local action upon the inflamed part, should be employed with care in order to avoid any injurious irritant effect.

---

[1] *Vide* Treatise on Ovarian Tumors, by the late Prof. E. Randolph Peaslee, New York, 1875.

When the affection is caused by calculi within the pelvis of the kidney, in addition to the foregoing measures of treatment, remedies may be given to prevent the further formation of calculi (*vide* Nephrolithiasis).

Proceeding from obstruction, especially if bilateral, and when associated with cystitis, the prognosis is unfavorable. The same indications for treatment exist as in other cases, together with supporting measures. Astringent remedies—alum, tannin, the acetate of lead, etc.—may be useful by diminishing the purulent discharge. The possibility of the disease being induced from the introduction of bacteria by means of unclean catheters in affections of the bladder or urethra, is to be borne in mind with reference to prophylaxis.

Pyonephrosis, if bilateral, associated, as it is generally, with either urinary calculi or cystitis, offers little scope for curative treatment. To be successful the treatment must effectually remove the causative conditions on which the pyonephrosis depends. If these continue to be operative, a fatal termination from uræmia will take place sooner or later, provided death be not caused by rupture and the escape of pus into the peritoneal cavity, or by exhaustion from the associated affections.

Unilateral pyonephrosis is less unfavorable, because less frequently connected with cystitis, and the danger of uræmia is comparatively small. A spontaneous cure sometimes takes place, the purulent contents of the pelvis of the kidney becoming inspissated, and the patient recovering with the loss of the function of the affected kidney. This, however, is a very rare termination. Generally the accumulation of pus goes on, and there is danger of rupture into the peritoneal or the pleural cavity. In order to avoid this danger, it would seem to be advisable to make an opening into the tumor in the lumbar region, as soon as the character of the affection is ascertained; and in order to demonstrate its character, an exploratory puncture would seem to be advisable. After the opening is made, the treatment is the same as in cases of renal or peri-nephritic abscess.

Hydronephrosis, if bilateral, ends sooner or later in uræmia from atrophy of the excretory structure of the kidneys. The preventive treatment is vastly important. This consists in removing, if possible, the obstruction. If the obstruction arise from phimosis or stricture of the urethra, it may be removed by surgical treatment. If the obstruction arise from prostatic enlargement, the distension of the bladder should be obviated by the daily use of the catheter. The soft rubber catheters now in use are invaluable in these cases. If the obstruction be not due to some congenital difficulty affecting the ureters, timely and persistent prophylactic treatment would probably always be successful in preventing the affection.

Unilateral hydronephrosis, after the excretory function of the kidney is destroyed, and the accumulation of urine in the dilated pelvis of the organ ceases, may be tolerated indefinitely, and perhaps with little or no inconvenience. A spontaneous rupture is of very rare occurrence. If, however, the dilated pelvis form a large tumor, the liquid may be withdrawn either by aspiration or a free opening. The danger is from peritonitis caused by the escape of the liquid into the peritoneal cavity. The practical question, in individual cases, is, whether the inconvenience caused by the tumor is sufficient to warrant the risk of either aspiration or tapping. With the results of clinical experience at present available, it is not easy to judge of the amount of risk incurred by these operations. A larger number of facts bearing on this point is desirable. The obstruction has sometimes been removed by making pressure over the tumor. The danger of causing rupture and peritonitis is to be considered in doing this, and, in view of this danger, much force should not be employed.

Renal Cysts with Enlargement of the Kidneys.

The diagnosis of cystic degeneration of the kidneys is possible only when they are considerably or greatly enlarged. The positive evidence is derived from palpation, together with the fact that the affection is generally bilateral. The negative evidence is the exclusion of the several affections which have just been considered. The affection may cause very great enlargement of one or both of the kidneys. Roberts cites a case in which one kidney measured 15¼ inches in length, 9½ in breadth, and 23 in circumference, the weight being 16 lbs.

The urine in cases of cystic degeneration is usually increased in quantity, and the specific gravity is low; it contains albumen, and hæmaturia is of frequent occurrence.

The enlarged organs are felt in the lumbar region, and, if the enlargement be great, also in the abdomen; they are soft but not fluctuating, and movable.

The absence of pain and tenderness, together with chills and febrile movement, excludes renal and perinephritic abscess, as well as pyonephrosis. Hydronephrosis is not as easily excluded. The differential points are the absence of fluctuation, the occurrence of hæmaturia, and the persistent, unchanging size of the cystic affection. Moreover, hydronephrosis is often unilateral. But although cystic degeneration is almost invariably bilateral, one kidney may be enormously increased in size, while the other is but little, or not at all, enlarged. Another point to be considered relates to age. Hydronephrosis occurs in young subjects, whereas cystic degeneration is rare prior to the age of thirty years.

Cancer is generally unilateral; its course is more rapid, and the general symptoms usually denote a malignant disease. Cystic degeneration, on the other hand, is bilateral; its course is slow, and the evidence of the cancerous cachexia is wanting. Hæmaturia is common to both affections.[1]

Roberts, in his "Practical Treatise on Urinary and Renal Diseases," reports a case in which a correct diagnosis was made by him, based "on the uræmic complexion of the symptoms and the existence of two soft renal tumors with albuminuria."

---

[1] *Vide* Case of Cystic Degeneration of the Kidneys, with Remarks, by John A. Octerlony, M.D., in the Transactions of the American Medical Association, vol. xxvi., 1875.

Cystic degeneration of the kidneys destroys life by inducing uræmia. The objects of treatment are the palliation of symptoms, the postponement of grave uræmic effects, and the measures indicated by the latter when they take place.

RENAL CANCER.

The kidneys are sometimes, but very rarely, the seat of secondary cancerous growths. Both kidneys are affected. As a rule, the organs are not enlarged sufficiently to be felt. The urine has no characteristic changes. Hence the existence of secondary renal cancer cannot be clinically ascertained. Primary cancer, on the other hand, which is extremely rare, is usually unilateral. The organ affected is often much enlarged, and the enlargement is sometimes enormous, forming a tumor which may occupy the greater part of the abdominal space. The author has seen a cancerous kidney, the disease occurring in a child eleven months old, which weighed 5½ pounds. A case is reported in the *American Journal of the Medical Sciences* in 1852, in which the organ weighed 10 pounds. Roberts cites a remarkable case in which the abdomen was enormously enlarged, the tumor weighing 31 pounds. In the great majority of cases the affection is the encephaloid variety. It is remarkable that, in this situation, primary cancer occurs chiefly in infancy or youth, and in advanced age, the middle period of life being nearly exempt from its occurrence. These facts are to be taken into account in the diagnosis.

The diagnostic points relate to a renal tumor, the occurrence of hæmaturia, and the evidences of a cancerous cachexia. A cancerous growth extends anteriorly toward the umbilicus. It is oftener on the right than on the left side. It is generally immovable in consequence of peritoneal adhesions. It does not descend with the inspiratory movements of the diaphragm. It does not give a sense of fluctuation. Pain and tenderness are not always marked. The surface of the tumor is irregular, and sometimes a notable difference at different points in its resistance—soft at some and hard at others—is appreciable; the latter is diagnostic of a cancerous tumor.

Renal abscess, pyonephrosis and hydronephrosis are to be excluded. They are generally associated with either urinary changes which are diagnostic, or with obstruction at some point where it can be ascertained. These are wanting in cancerous disease. Renal and perinephritic abscess form tumors which are discovered in the flank or lumbar region; and in these, together with the two other affections named, an exploratory puncture shows their character. An exploratory puncture has been found available for a positive diagnosis of cancer, its histological characters having been found in the matter withdrawn.

On the right side, a cancerous kidney is to be distinguished from enlargement of the liver, by finding that the fingers can be pressed between it and the lower extremity of the latter. On the left side it is to be distinguished from an enlarged spleen by the absence of mobility, and of the characters which are distinctive of the margin of the latter organ.

An ovarian cyst is to be excluded by the absence of its diagnostic characters.[1]

Fecal tumors may be excluded by the absence of their diagnostic characters; and, if there be room for doubt, by the employment of measures which will effect their removal (*vide* page 328).

The differentiation of cystic enlargement of the kidneys has been considered (*vide* page 434).

Hæmaturia is an important diagnostic event. It occurs in a large proportion of the cases of renal cancer, and, as a rule, repeatedly in the course of the disease. The blood is intimately mixed with the urine, and casts of the ureter, preceded by renal colic, are sometimes expelled. The author has met with a case in which a striking feature was the expulsion of numerous casts resembling in appearance lumbricoid worms.

Aside from hæmaturia, the urine has no changes which are diagnostic. The histological elements of cancer are very rarely found.

The progressive enlargement of the tumor and the progress of the disease vary. In young children the local affection progresses rapidly, and the duration may embrace only a few weeks after a tumor is discovered. In adults the duration rarely extends beyond two years. The progress is unattended by fever. The temperature is sometimes below the normal limit. The evidences of the cancerous cachexia—pallor, yellowness, emaciation, etc.—corroborate the diagnosis.

A positive diagnosis carries with it a fatal prognosis. The treatment embraces only palliative and supporting measures.

HYDATID DISEASE OF THE KIDNEY.

Hydatid disease of the kidney is one of the rarest of rare diseases in this country. The author has never met with an instance. But, bearing in mind the fact that it may occur, it is recognized without difficulty when the diagnostic evidence of its existence is available. A diagnosis cannot be made without the discharge of either hydatid vesicles or the hooklets of echinococci in a situation where they come under observation. In the great majority of cases, the hydatid cyst opens into the pelvis of the kidney, and the vesicles or the remains of the echinococci are discharged with the urine. In the passage of the vesicles along the ureter they may give rise to the symptoms of renal colic. If the hydatid cyst have suppurated, the urine may contain pus. Without suppuration, it not infrequently contains blood. The proof that the hydatid cyst is contained in the kidney is not absolute; but the probability of its being situated elsewhere, and opening into either the pelvis of the kidney or the bladder, is so small that it may be almost disregarded. The proof of the renal situation is, however, positive, if the kidney be felt to be more or less enlarged, and if the enlargement diminish after the vesicles or hooklets have appeared in the urine. Prior to the discharge of the contents of the cyst, the affection is likely to be confounded with hydronephrosis. This error can only be avoided by ascertaining the character of the contents, resorting for this purpose to an exploratory puncture. It is very doubtful if the hydatid vibration be ever available in the diagnosis. The error just stated would not be of much, if any, practical importance. It might prove an unfortunate error to mistake the affection for an ovarian cyst.

---

[1] *Vide* Peaslee on Ovarian Tumors.

Other directions in which the cyst may open are the post-renal areolar tissue, whence the contents may make their way externally into the colon, or the bronchial tubes. It is stated that an instance of opening into the peritoneal cavity is not on record.

Suppuration of the hydatid cyst may take place here as in other situations. The affection is then converted into abscess.

The prognosis is favorable if the cyst open into the pelvis of the kidney. In some cases, however, the discharge of vesicles or their fragments recurs from time to time during a long period. The intervals between the recurrences may be many years. When the opening is in other directions, the prognosis is by no means extremely unfavorable, although less favorable than when the contents of the cyst are discharged with the urine.

The affection is almost invariably unilateral.

The prophylactic treatment is the same as in hydatid disease of the liver (*vide* page 381). If the cyst attain to a large size, aspiration is probably advisable. Aside from this operative interference, the treatment is to be guided by the symptoms. Rest is to be enjoined in order to avoid risk of producing rupture of the cyst in an unfavorable situation.

TUBERCULOUS DISEASE OF THE KIDNEYS. NEPHROPHTHISIS.

In generalized tuberculosis the kidneys not infrequently contain granulations or miliary tubercles. They occasion no appreciable local disturbance, and it is impossible to determine the fact of their existence during life. On the other hand, a morbid product is sometimes seated in one or both of the kidneys, which undergoes a cheesy metamorphosis, and, becoming liquefied, is discharged, leaving a cavity or cavities with irregular walls. The behavior is analogous to that of pneumonic phthisis, and the affection is not inappropriately named nephrophthisis or renal phthisis. The relation of this product to tubercles is of pathological interest, but the discussion of this topic is here waived. The affection often involves the pelvis of the kidney, the ureter, and not infrequently the bladder. Pyelitis, as a rule, coexists, whether the point of departure of the affection be the pelvis or the cortical portion of the organ. In the majority of cases the affection is unilateral. The number of cases in which both kidneys are affected is considerable, but usually the amount of disease in one is much greater than in the other.

The local symptoms are those of pyelitis. There is more or less of pain or uneasiness referable to the loins on one or both sides. The urine is purulent and sometimes bloody. Blood, however, is never as abundant as in cases of cancer, and is often wanting. A highly diagnostic feature of the urine is the presence, in some cases, of cheesy granules, portions of connective tissue, and elastic fibres. The significance of these is the same as when they are present in the expectoration in cases of pneumonic phthisis.

There is rarely much enlargement of the kidney. Exceptionally, the enlargement is considerable or even great.

In a large majority of cases, the lungs are the seat of a phthisical affection (in 28 of 30 cases analyzed by Roberts). In men, the testes, prostate gland, or the vesiculæ seminales are apt to become involved. Other organs, namely, the mesenteric glands, intestines, peritoneum, spleen, and liver, are affected in a certain proportion of cases. The coexisting pulmonary disease is of importance with reference to the diagnosis. Uræmic phenomena sometimes occur when the affection is bilateral.

The disease, certainly in the vast majority of cases, proves fatal. Its duration varies from six months to three years, depending, other things being equal, upon its limitation to one kidney or its affecting both organs, the amount of the local affection together with its extension to the urinary appendages, and its complications.

The treatment consists of palliative remedies and those measures which are indicated in pneumonic phthisis.

NEW FORMATIONS IN THE KIDNEY.

The kidney is sometimes the seat of different varieties of new formations, morbid growths, or neoplasms other than cancer, namely, fibromata, lipomata, myxomata, sarcomata, gliomata, angiomata, lymphangioma, osteoma, and syphilitic (gummy) tumors. All these are extremely rare in this situation. From their infrequency and the impossibility of their diagnosis, they are of little clinical importance. They are of interest chiefly to the morbid anatomist or pathologist.

RENAL COLIC. NEPHROLITHIASIS.

Calculous concretions, or, in rare instances, solid masses of fibrin and hydatid vesicles, contained in the pelvis of the kidney, and passing thence into the ureter, give rise to the affection known as renal or nephritic colic. It is analogous to the passage of biliary calculi or hepatic colic. It is, of course, essential that the body be of sufficient size to occasion more or less difficulty and delay in its passage from the kidney to the bladder. The following account of an attack of renal colic embraces its diagnostic features: The first symptom is pain, which occurs suddenly, the person being perhaps apparently in perfect health. The pain at the outset is felt in the lumbar region on one side. In a severe attack the pain quickly becomes excruciating. The patient is unable to endure it in silence and at rest. There is a disposition to walk about if the patient be up, or to change the position constantly if in bed. The body is inclined to the affected side. Loud groans are with great difficulty repressed. There is often a feeling of faintness, and swooning sometimes takes place. The body is covered with perspiration. Nausea and vomiting are not infrequent. The pain either rapidly or slowly moves in a direction downward toward the bladder. A patient, after repeated attacks, is made sensible of the progress of the calculus along the ureter by the varying situation of the pain. The pain is lancinating, and peculiarly subduing. The testicle on the affected side is often, but not invariably, retracted by spasm of the cremaster muscle. There is a frequent and sometimes an incessant desire to urinate, the quantity of urine expelled being small, perhaps only a few drops at a time, and this is sometimes bloody. The pulse is small and weak. There is no fever. The duration of the paroxysm varies from a few hours to a day or longer. Relief takes place suddenly and completely when the calculus passes from the ureter into the bladder. Directly the pain and other symptoms cease, there is an abundant emission of urine.

These characters, which are always more or less marked, render the diagnosis positive. Corroborative proof, however, is obtained by the subsequent expulsion of either a calculus, a mass of fibrin, or an hydatid vesicle with the urine. But if all the urine afterward passed be not preserved and examined, this proof may not be obtained; for a calculus or other solid body large enough to cause a severe attack of renal colic, may escape from the urethra without exciting observation. The proof may not be obtained for another reason, namely, the body which has passed through the ureter may be retained within the bladder. If so retained, it is liable to increase in size, and require for its removal lithontripsy or lithotomy. In a certain proportion of cases vesical calculus or stones in the bladder originate from renal concretions. After they have passed from the ureter they are in the domain of surgery.

Paroxysms of renal colic occur with variable degrees of severity. They may be comparatively slight, lasting perhaps but a few moments. Their recurrence is variable. A succession of attacks may occur within a brief period, showing that a greater or less number of concretions pass in quick succession. The passing of a calculus of considerable size, by dilating the ureter, favors the passage of others which are contained within the pelvis of the kidney. On the other hand, there may be, from time to time, the formation of new concretions. Patients who have had an attack, or a series of attacks, are apt to suffer from a return after the lapse of weeks, months, or years. There is no uniform law in respect of the number of attacks, or the length of the intervals. The variations in these regards depend on the conditions involved in the formation of calculi.

In some cases of renal colic the pain ceases to be intense after twenty-four hours or a longer period, but complete relief is not obtained. The diminution in the quantity of the urine continues. More or less suffering is referred to the lumbar region over the site of the kidney, and after a time a tumor may be felt in that region. In these cases a calculus has become impacted in the ureter, involving obstruction to the passage of urine, and giving rise to hydro- or pyonephrosis.

The presence of a calculus or of calculi in the pelvis of the kidney, without obstruction, may be inferred when renal colic has occurred once or repeatedly, and the symptoms denote pyelitis (*vide* page 431). The probability of other attacks may be based on these symptoms; yet pyelitis by no means always precedes an attack, nor exists in the intervals between successive attacks.

Treatment of Renal Colic.

The objects of treatment are the relief of the intensity of the pain, and the promotion of the passage of the calculus. For the first of these objects opium is indicated. It may be given either by the mouth or by hypodermic injection; the latter is the more prompt and efficient method of administration. The doses are to be graduated according to the intensity of the pain. Opium affords notable relief, but it does not extinguish the pain unless carried to the extent of producing narcotism, which, of course, is to be avoided. The inhalation of chloroform or ether is an invaluable adjunct to the use of opium. This may be carried to the extent of producing effectual relief without inducing a dangerous anæsthetic effect. As soon as the patient ceases to feel pain the inhalation should be suspended, and resumed when the effect subsides and the pain returns. In this way the patient may be carried through the paroxysm without great suffering. It is probable that these measures promote the passage of the calculus, and thereby shorten the duration of the paroxysm. For the latter object, in addition, the warm bath is useful. Fluids, also, should be taken into the stomach as freely as possible in order to increase the quantity of urine, the calculus being propelled onward by the accumulation of liquid behind it.

The Prophylactic Treatment in Cases of Renal Colic.

The prophylactic treatment embraces measures for preventing the formation of renal calculi, and for dissolving those which may be contained in the pelvis of the kidney.

Measures for prevention are indicated when an attack of renal colic has taken place. Prior to this it is impossible to judge of the liability to the formation of calculi; but, if there have been an attack of renal colic, clinical experience teaches that other concretions are apt to form, if they do not already exist.

To know the composition of a calculus which has occasioned an attack of renal colic, is important; and, for this reason, it is desirable that its expulsion from the bladder should not escape observation. In the great majority of cases, renal calculi consist chiefly of uric acid. Their color is usually either deep red or reddish-brown. They are not easily broken. They dissolve in a weak solution of the carbonate of potassa or soda. What is known as the murexid test is the most delicate and reliable. This is employed as follows: A small quantity is placed on a porcelain dish or a slip of glass, a couple of drops of strong nitric acid are added, and heat applied by a spirit lamp. The uric acid dissolves with effervescence, and a yellowish-red residue remains. The latter, when touched by a rod dipped in caustic ammonia, instantly assumes a bright violet hue, which is characteristic.[1]

---

[1] Roberts, op. cit.

The conditions of the urine under which there is liability to the precipitation of uric acid sufficiently to form renal calculi, are undue acidity, concentration, and a more or less abundant deposit of the characteristic crystals, in specimens of urine examined either before or shortly after it becomes cold. These conditions following or occurring at any period after an attack of renal colic, furnish therapeutic indications. The passage of an uric acid calculus through the ureter does not, however, imply always the existence of these conditions at that time, for two reasons, namely: *first*, the calculus may have been formed for a greater or less period before it passes from the pelvis of the kidney into the ureter; and, *second*, the formation of a calculus may be independent of these conditions, having been caused by the presence of a mass of fibrin or blood, which serves as a nucleus, the composition of the urine being normal.

If, after an attack of renal colic, the calculus be not obtained, it is presumably of the uric acid variety, although the foregoing conditions of the urine be not present, in view of the fact that this is the variety in so large a proportion of cases. The presumption is still greater if the patient be beyond the middle period of life, inasmuch as this variety of calculus occurs oftener at that period than at an earlier age; and, assuming the calculus to be renal, not vesical, it is certainly formed of uric acid if the patient be subject to gout, since this variety is especially apt to occur in gouty subjects.

The treatment preventive of uric acid calculi is as follows: Liquids should be taken freely in order that the urine may not be too concentrated. Alkalies are to be prescribed moderately. Uric acid will not be precipitated in alkaline urine. A drachm of the bicarbonate of potassa may be given morning and evening. It may be given during effervescence with a solution of citric acid, or with lemonade. The Vichy and other alkaline mineral waters are appropriate. The use of alkalies should not be excessive, nor given continuously for too long a period. After three or four weeks, they should be intermitted for a week or two. The indications for their continued use may be obtained by examination of the urine with reference to its quantity, acidity, and the formation of uric acid crystals shortly after its emission. The appearance of the crystals in specimens of urine examined several hours after its emission, is no evidence of the liability to their formation within the body. The diet should consist of a moderate proportion of animal food, and especially of the stronger meats, namely, beef and mutton. Young meats, fish, and fowl are to be preferred. Experiments have shown that a large proportion of animal food increases the amount of uric acid in the urine, and especially if the habits of life are indolent; hence, a certain amount of active exercise is to be enjoined.

An object in the prophylaxis of renal colic is the dissolving of calculi in the pelvis of the kidney. Experiments in subjecting uric acid concretions to the influence of alkaline solutions out of the body, and clinical observations, appear to show conclusively the efficacy of solvent treatment. Adopting the conclusions of Roberts, uric acid calculi are dissolved more readily in a weak solution of the salts of potassa than of soda. The acetate and the citrate of potassa are the remedies to be preferred, since they are well tolerated, and do not interfere with digestion. From forty to fifty grains of either of these salts, dissolved in three or four ounces of water are to be given every three hours. The object is to maintain, as far as possible, a continuous alkalinity of the urine. Roberts states that this treatment may be continued without risk of harm for several weeks, and even months. If the urine become ammoniacal, as denoted by its offensive smell, its solvent power is arrested: hence, it should be frequently examined, and the alkalies suspended whenever this effect is produced.

Calculi composed of urates, and those consisting of cystine, are extremely rare. The preventive and the solvent treatment are the same as are indicated in cases of uric acid calculi. The urate concretions are soluble in hot water. The cystine calculi are friable, and, following Roberts, they are recognized with facility by means of the following test: A particle placed on a slip of glass, and treated with caustic ammonia, quickly dissolves; after a few hours the alkali evaporates, and hexagonal crystals are formed, which are highly characteristic.[1]

Oxalate of lime calculi are distinguished by their hardness and roughness of surface. From the latter peculiarity they are called mulberry calculi. They are insoluble in alkaline solutions, but dissolve in nitric or muriatic acid. They are reduced by the blowpipe to a white ash, which gives an alkaline reaction with litmus paper.

Renal, far less often than vesical, calculi are composed of two or more ingredients. Not infrequently, however, renal calculi contain both uric acid and the oxalate of lime. Either the uric acid or the oxalate of lime may constitute the nucleus, oftener the former than the latter, and the two ingredients are sometimes deposited in alternate layers. The preventive treatment after the passage of a calculus of this mixed composition, must have reference to the character of the urine at that time. The liability to the precipitation of oxalate of lime may be inferred when this constituent is found in the urine constantly, and in considerable abundance (oxaluria). On the other hand, if the characters of the urine show liability to the precipitation of uric acid, the treatment should have reference thereto. The conditions for the formation of the uric acid and the oxalate of lime calculi may coexist.

It is doubtful whether alkaline remedies have any prophylactic influence as regards the formation of the oxalate of lime calculi. These remedies, however, are not contraindicated. The free ingestion of liquids in order that the urine may not become too concentrated, is as important in preventing the precipitation of the oxalate of lime as of uric acid. Articles of food which contain oxalates in abundance (the rhubarb plant and sorrel) are to be avoided, and also water which contains lime.

There is no solvent treatment for renal calculi which consist of the oxalate of lime. The alkalies have no effect upon them out of the body.

The calculus which consists of xanthine or uric oxide, a substance differing from uric acid in having two atoms less of oxygen, is so extremely rare, and so little is known respecting it, that at present it has very little clinical importance.

Calculi, composed of phosphates or consisting of the carbonate of lime, are very rarely of renal origin. These ingredients enter more or less into the composition of vesical calculi. Renal calculi become coated therewith if they remain long in the bladder. Their formation depends on local causes which render the urine ammoniacal either in the pelvis of the kidney or the bladder. These causes are generally incident to pyelitis or cystitis. The calculi are soft, white, and chalky. They dissolve quickly in an acid. The urine, when emitted, is alkaline.

---

[1] For other tests, *vide* article by Ebstein in Ziemssen's Cyc., Am. ed., vol. xv. p. 702.

The preventive treatment consists in the free use of carbonic acid water and the vegetable acids.

HÆMATURIA. HÆMATINURIA OR HÆMOGLOBINURIA.

The first of these three terms denotes the presence in the urine of blood in its entirety, that is, including the red corpuscles. The two latter terms denote the presence of hæmatin or hæmoglobin without the red corpuscles. This distinction is important in regard to pathological significance. In hæmaturia, a true hemorrhage has occurred in either the urethra, bladder, ureter, or kidneys. In hæmatinuria or hæmoglobinuria, the inference from the absence of red corpuscles is, that dissolution of these has taken place within the bloodvessels, and the hæmatin is excreted by the kidneys. The latter is not a true hemorrhage; there is no rupture of bloodvessels. The differentiation of hæmaturia and hæmatinuria is to be based on the result of microscopical observations. In the former, blood-corpuscles, more or less changed, are discoverable; in the latter, they are absent. The presence of blood pigment, in addition to the appearance to the eye, may be determined by tests (*vide* page 402).

Hæmaturia is among the diagnostic symptoms of several of the renal affections which have been considered. It occurs, together with hemorrhage in other situations, in scorbutus and purpura hæmorrhagica. It is an occasional event in the course of the eruptive and the continued fevers. In order to be regarded as an individual affection, it must occur irrespective of these pathological connections, and when it cannot be referred to any local or general disease. It is probable that, in most of the rare cases in which apparently bloody urine is idiopathic, the affection is hæmatinuria. This, instead of hæmaturia, is probably the condition in the variety of pernicious intermittent fever distinguished as hemorrhagic. Hæmaturia, in Brazil, Egypt, the Cape of Good Hope, and some other tropical situations, is caused by the presence in the urinary passages of the parasite bilharzia hæmatobia.

Within the past few years, cases have been reported by Harley, Dickinson, Greenhow, Roberts, Pavy, and others, in which hæmatinuria has occurred as a paroxysmal affection. The paroxysms are independent of malaria. They are ushered in by a chill, frequently accompanied by rigors, not always followed by either fever or sweating; and, after a period varying from half an hour to a couple of hours, the urine voided is dark, resembling porter, depositing a chocolate-colored sediment. The latter consists of amorphous granular matter supposed to be disintegrated blood-corpuscles. After from three to twelve hours, the hæmatin disappears from the urine. These paroxysms may occur twice daily, or on alternate days, or after irregular intervals, ceasing after several days, weeks, or months. The affection may recur after intervals varying for months or years. The paroxysms are often attributable to exposure to cold. They have not been observed to occur at night.[1] Prof. Lichtheim, of Jena, has recently reported some cases belonging in the group described by the authors just named, under the name Periodic Hæmoglobinuria.[2] The author has met with instances of apparent hæmaturia not connected with any appreciable affection of the kidneys or urinary passages, which were probably cases of hæmatinuria, the distinction between the two conditions not having been until lately pointed out. At the present time, a patient under his observation has had repeated attacks of the paroxysms just described, a microscopical examination of the urine showing absence of the morphological constituents of the blood. In the intervals, this patient, as a rule, has robust health, discharging the arduous duties of a high official position.

Paroxysmal hæmatinuria has no tendency to a fatal ending. In no case as yet reported has there been an opportunity for an autopsical examination. Relapses are apt to occur for an indefinite period. The treatment indicated in true hemorrhages, namely, by hæmostatic remedies, is of no use in this affection. Quinia and iron have thus far been found most useful. Avoidance of exposure to cold is an important precaution as a means for preventing relapses.

In true hemorrhage, or hæmaturia, referable to the kidneys, in addition to absolute rest and warmth of the surface of the body, cold may be applied over the loins and dry cupping employed. Hæmostatic remedies are indicated in proportion to the amount of hemorrhage. Ergot, alum, gallic acid, the acetate of lead and opium, turpentine, matico, krameria, and the astringent preparations of iron are the remedies from which a selection is to be made, or which are to be resorted to in succession if the hæmaturia continue. Other indications are to be derived from the associated symptoms and the general condition of the patient.

CONGESTION OF THE KIDNEYS.

Congestion (hyperæmia) of the kidneys may give rise to symptoms which, in connection with etiological circumstances, are sufficient for its clinical recognition. Here, as in other situations, congestion may be active or passive; active congestion being due to an abnormal determination of blood in the arteries, and passive congestion being caused by an insufficient return of blood by the veins.

Active congestion occurs in some cases of the essential fevers, including under this name articular rheumatism, pyæmia, and erysipelatous fever; also in cases of acute pneumonia (pneumonic fever) and other acute inflammations. It is sometimes attributable to exposure to cold.

---

[1] *Vide* Roberts, in Reynolds's System of Med., vol. v. Also Report of Cases, by Edward Headlam Greenhow, in Trans. Clinical Society of London, vol. i., 1868.

[2] *Vide* Sammlung Klinisher Vorträge, von Richard Volkmann, No. 134, April, 1878, Leipzig.

It may be produced by remedies which are especially irritating to the kidneys, namely, cantharides, turpentine, copaiba, and large doses of the nitrate of potassa. These pathological connections and causes are to be borne in mind with reference to the diagnosis.

The local symptoms are the presence of albumen in small quantity in the urine, together with sometimes a little blood from renal hemorrhage, a few fibrinous casts, and some renal epithelium. The quantity of urine is not increased, and may be diminished. Suppression of urine (anuria) may, perhaps, be caused by congestion. Pain in the region of the kidneys is not a prominent symptom, the patient complaining only of a sense of uneasiness, and this is not constant.

The pathological condition is the same as in the first stage of acute parenchymatous nephritis. The latter affection probably, in some cases, commences and aborts at the first stage. In these cases, the affection is equivalent to active congestion; the differential diagnosis is impossible. Active congestion never gives rise to general dropsy, and very rarely to uræmia. If it be not either a precursor or the first stage of acute parenchymatous nephritis, the duration is generally brief, and it ends in recovery. Some writers designate the affection renal catarrh.

Active congestion of the kidneys is to be treated by dry or sometimes wet cupping over the loins, the latter when the patient is robust and attacked in full health. Warm fomentations are to be applied over the loins. A saline purgative is advisable in order to diminish the functional labor of the kidneys. The warm bath, or, still better, the hot-air bath, is advisable for the same end, together with diaphoretic remedies. Rest, warmth of the surface of the body, and an unstimulating diet are to be enjoined.

Passive congestion of the kidneys is always symptomatic, or an effect of some other pathological condition. It is an effect of dilatation of the right side of the heart following mitral lesions, pulmonary emphysema, or cirrhosis of the lung. It may be caused by a tumor, or the gravid uterus pressing on the renal veins or the ascending vena cava.

In passive congestion the urine contains a small quantity of albumen, perhaps only a trace; a few hyaline casts are sometimes found, together with some renal epithelium and a few blood disks.

If the condition proceed from cardiac obstruction, evidence of congestion of the systemic venous system is afforded by embarrassment of respiration, and cyanosis. If it proceed from a cause affecting the renal veins and not the whole venous system, the symptoms just stated are wanting. In the former case there may be, and generally there is, anasarca; in the latter case, œdema is confined to the lower extremities.

The important practical point connected with the diagnosis of passive congestion of the kidneys, is, that under the circumstances which bear upon its etiology, the local symptoms referable to the urine, namely, albuminuria and a few casts, may denote congestion only, and not lesions of the kidneys or chronic Bright's disease. It is, however, to be considered that persistent passive congestion may lead to the latter.

As regards the treatment of the passive congestion of the kidneys, it is sufficient to say that it relates to the affections or pathological conditions of which the congestion of these organs is either a symptom or an effect.

MOVABLE OR FLOATING KIDNEY.

The kidney, although normally fixed by its peritoneal investment and the adipose tissue surrounding it, may become loosed and dislocated, forming a movable or floating body within the abdominal cavity. This condition is sometimes congenital, but oftener acquired. It occurs in women much oftener than in men. In the great majority of cases one kidney only is movable, but in a small minority this is true of both kidneys. The right, much oftener than the left, kidney is liable to become movable. The occurrence is not extremely infrequent. It is apt to be overlooked, or to lead to errors in diagnosis. A distended gall-bladder, a fecal collection, an ovarian tumor, and a mobile spleen, may be mistaken for it, and *vice versa*. A dislocated kidney is not always movable. Sometimes it becomes adherent and remains fixed in an abnormal situation; the diagnosis is then more difficult than when it is movable.

In most instances the diagnosis can be made without difficulty. If there be not great obesity, and especially if the abdominal walls be flaccid, the form of the floating body can be determined by palpation. It may sometimes be grasped, and, as it were, held in the hand. It is situated generally between the false ribs and the umbilicus, but it sometimes descends into the iliac fossa. If it have not become adherent, it may be moved freely in different directions; its situation changes with the position of the body; it is raised and lowered by the alternate acts of breathing. If the patient lie on the back, it can be restored to its normal situation. On the posterior aspect of the trunk, the patient inclining forward, a depression may sometimes be observed in the normal situation of the movable kidney, and this may disappear when the kidney is replaced. The dulness on percussion over the renal region may be wanting, and, in place thereof, a tympanitic intestinal resonance be found. The majority of these points are generally available, and render the diagnosis positive.

A movable kidney sometimes occasions little or no inconvenience. The patient may not be conscious that anything is wrong. Frequently, however, it gives rise to much uneasiness and pain, the probable explanation being that obstruction to the flow of urine is caused by stretching and twisting of the ureter. Pain sometimes occurs in paroxysms resembling those of renal colic. The obstruction may lead to hydronephrosis. Aside from this effect, there is absence of danger.

The object of treatment is, after restoring the kidney as near as possible to its normal situation, to keep it in place by means of a compress or band, together with a bandage or an abdominal supporter. Beyond this object, the relief of pain by opiates is the only measure of treatment indicated.

DIABETES MELLITUS AND INSIPIDUS.

The only important clinical fact which is common to these two affections is polyuria, an immoderate quantity of urine. This is the chief distinctive feature of diabetes insipidus. Polyuria expresses the clinical fact just stated, but the term hydruria the distinctive feature, inasmuch as the increase of urine is due to an excess of water. Diabetes mellitus is characterized not alone by polyuria, but by the presence of sugar, an appreciable amount of which is not contained in normal urine. Indeed, the latter is the only constant characteristic, for saccharine urine does not always exceed in quantity that of health. Glycosuria denotes the presence of sugar in the urine, but glycohæmia more appropriately the distinctive pathological feature of the affection, inasmuch as the urine is saccharine because sugar is present in the blood contained in the systemic arteries. Owing to these points of contrast, the two forms of diabetes claim separate consideration.

DIABETES MELLITUS.

A considerable increase in the quantity of urine, not occasionally, but persistently, accompanied by thirst, impaired mental or physical endurance, and loss in weight, should always excite suspicion of the existence of this affection. These symptoms usually exist for some time before the patient considers them of importance enough to consult a physician. It sometimes happens that pruritus of the vulva or prepuce leads to the application for medical advice. Loss of sexual desire or capacity may be the first ailment which causes anxiety. In the majority of cases, when the existence of the affection is ascertained, the previous history shows that it has existed for weeks, or it may be months. The diagnosis is to be based upon the results of examination of the urine for the presence of sugar. The presence of sugar in the urine increases its specific gravity. If the quantity of urine be considerably increased—for instance, amounting to 70, 80, 100 ounces or more within twenty-four hours, and the specific gravity be 1.030 or greater than this, it probably contains sugar. On the other hand, with this increase of quantity, if the specific gravity be below that of health—for instance, 1.010—the absence of sugar may be inferred. The evidence, however, either for or against the presence of sugar, afforded by the specific gravity taken in connection with the quantity, should not be relied upon, inasmuch as either positive or negative proof can easily be obtained. The methods of testing for sugar are various. It not only suffices, but it is desirable, in medical practice, to employ those tests which are simple and readily available. A trace of sugar is occasionally found in the urine of healthy persons. It has been claimed, indeed, that sugar is a constituent of normal urine in a quantity inappreciable by ordinary tests. However this may be, the discovery, by an extremely delicate test, of a trace of sugar, may occasion much needless anxiety, as was exemplified in the following case:—

A healthy young man who had the misfortune to fall into the habit of constantly watching all his functions in order to discover evidences of disorder, and who had become pathophobic, submitted a specimen of his urine to an eminent analytical chemist, who, without any knowledge of the person or of the case, reported the presence of a small quantity of sugar. At once the fear of diabetes engrossed his thoughts, and was dispelled only after quantitative examinations of the urine, made daily for a considerable period, failed in again discovering any evidence of sugar.

Under a variety of circumstances the urine may contain sugar for a short period. This occurs in cases of cerebral injuries, tumors of the brain, meningitis, and acute mania; in certain affections of the liver; sometimes in diseases which involve disturbance of the respiratory function; after the inhalation of chloroform, ether, and other vapors; as a toxical effect of corrosive sublimate and other poisons; from the ingestion of saccharine and starchy articles in large quantity, etc.

Glycosuria is not always proof of diabetes, inasmuch as the presence of a small quantity of sugar in the urine is an occasional symptom in numerous pathological conditions. The diagnosis of diabetes, however, is not thereby rendered difficult. When this affection exists, the urine, prior to treatment, always contains sugar in more or less abundance, and it rarely disappears from the urine within a very brief period. The sugar in cases of diabetes sometimes temporarily disappears during an intercurrent, inflammatory, or febrile disease. An examination of the urine for the first time during the progress of such a disease, might lead to an erroneous exclusion of the diabetic affection.

Of the numerous tests for sugar in urine, two may be given as simple, reliable, and readily available. It suffices, therefore, to introduce these. They are the fermentation test, and the modification of Trommer's copper test by Fehling.

The method of performing the fermentation test is as follows: A little German yeast is placed in a test-tube filled with urine. The tube is then inverted in a saucer containing some of the urine, and allowed to remain for several hours in a warm place. Fermentation ensues, carbonic acid gas collects at the upper portion of the tube, and expels the urine from it. The nature of the gas is demonstrated by introducing into the tube a lighted match. Roberts states that this test will not show the presence of sugar if the quantity of the latter be two and a half grains or under to the ounce of urine. By the difference in the specific gravity of the urine, however, before and after fermentation, less than one per cent. of sugar may be detected. The time required for the employment of this test is a matter of small importance.

In Fehling's test a solution of the sulphate of copper with liquor sodæ and the tartrate of potassa is employed. This test solution is prepared after the following formula: Sulphate of copper, 90½ grains; neutral tartrate of potassa, 364 grains; solution of caustic soda, specific gravity 1.12, four fluidounces. Add water to make six fluidounces. A smal quantity of this solution in a test-tube is heated to the boiling point, an a drop or two of the urine then added. The presence of sugar is show by the instant production of a brick-red or rich yellow color. If th effect be not produced, the liquid is to be again brought to the boili *point*, and more urine added, the quantity not exceeding, however, t volume of the test liquid. If there be no change of color, the absence of sugar is positively determined.[1]

The test solution of Fehling deteriorates if air be not excluded. The deterioration, however, is evident as soon as it is brought to the boiling point, by its becoming opaque, and depositing a red sediment. If the solution remain clear, it is unchanged, and may be relied upon.[2]

In examining albuminous urine for sugar, the albumen should be coagulated by heat, and filtered before employing Fehling's test.

A quantitative test of diabetic urine for sugar may be a matter of curiosity or interest, but it is of no importance as regards the diagnosis and treatment of cases of diabetes. It is, of course, important to know whether the quantity of sugar in the urine diminishes during the treatment of the disease, and to judge of the degree of diminution. Comparative examinations in respect of quantity and specific gravity, practically suffice, and the disappearance of sugar is readily ascertained by the qualitative tests. To determine the amount of sugar excreted is, however, not difficult. Two methods of quantitative analysis may be employed, one the "differential density method" of Roberts, and the other a volumetric method by means of Fehling's test solution. The following is a quoted description of the process in each of these two methods:—

In employing Roberts's method, "two specimens of diabetic urine are taken, one for comparison and one for analysis. To one is added a small lump of German yeast in a bottle, with a nicked cork to allow of the escape of gas; and the other specimen is placed in a similar bottle, tightly corked. The two bottles are then set aside in a warm place, on the mantle-piece in winter, or in the sun in summer. In twenty-four hours the fermentation will have been completed in the specimen to which yeast has been added. If the specific gravity be now compared, the fermented specimen will be found much the lighter from loss of sugar, which has been decomposed into alcohol and carbonic acid. The difference in the density of the two specimens, expressed in degrees of the urinometer, will represent the number of grains of sugar per fluidounce in the urine. For example, if the specific gravity of the fermented specimen be 1.010, and the specific gravity of the unfermented specimen 1.040, the urine contains 30 grains of sugar per fluidounce. In this process it is essential to compare the densities of the two specimens at the same temperature."

"The volumetric method is a little more troublesome, though it is also very simple. Fehling's test liquid is made up by the formula already given (*vide* page 448), and 200 grains are measured off in a tube graduated for that purpose. The diabetic urine is then diluted with water, so that the proportion of urine shall be one in five or ten. The test-liquid is diluted with about twice its volume of water, and placed in a shallow porcelain dish with a handle. A piece of caustic potash, about the size of a pea, added to the test-liquid, will facilitate the precipitation. A burette, graduated in grains, is now filled with the diluted urine to 0. The test is then boiled, and the diluted urine is added from the burette in small quantities from time to time, producing each time a copious red precipitate, and gradually discharging the blue color of the test-liquid. After each addition of urine the mixture should be brought again to the boiling point, and a few seconds allowed for the precipitate to fall. When the blue color of the test-liquid has entirely disappeared, as can be ascertained by tipping the vessel when the precipitate has subsided so that the color of the liquid is not obscured, and when no further precipitate is formed by adding the urine, the analysis is complete. As the two hundred grains of the test used exactly correspond to one grain of sugar, by reading off the number of grains added from the burette, the calculation may be easily made. For example, if the urine be diluted so that ten parts of the mixture represent one of urine, and if one hundred grains of the mixture be used from the burette, ten grains of urine contain one grain of sugar. This gives the proportion of sugar per hundred or thousand. By reference to a table which gives the weight of a fluidounce of different specific gravities, the amount of sugar per fluidounce, and afterward the total quantity in the twenty-four hours, may be calculated by multiplying the weight of a fluidounce by the percentage of sugar, and dividing by 100."[1]

---

[1] *Vide* Roberts, op. cit.

[2] Dr. Squibb prepares a solution of copper for testing the urine which remains unaffected for an indefinite time. The author has kept a quantity for daily use for more than a year without any change having taken place.

Persisting glycosuria establishes the fact of the existence of diabetes mellitus. Nothing beyond examination of the urine is required for the diagnosis. To substantiate it other symptoms are not necessary. The latter are chiefly useful as rendering probable the existence of the disease, and leading to examinations which otherwise might have been omitted. Inordinate thirst, notable increase in the quantity of urine, pruritus of the vulva or prepuce, and impairment of the sexual function, have been already named. To these are to be added a characteristic fragrant odor of the breath, not unlike that of chloroform, the formation of cataracts, premature far-sightedness, and dimness of vision.

Treatment of Diabetes Mellitus.

In the great majority of the cases of diabetes a cure is not to be expected. In a certain proportion of cases, however, the sugar disappears from the urine under treatment, and recovery apparently takes place. Probably in many of these cases the disease returns sooner or later. With reference to this point, the collection of a considerable number of cases, the subsequent histories being ascertained, is a desideratum. It is certain that in some instances many years pass without relapse. It is warrantable to hold out to patients the possibility of a cure. The statement that the disease is always incurable being unwarrantable, if made to patients, it is alike unjust to them and to medicine. The grounds for encouragement to hope for a cure are, advanced age corpulence, absence of polyuria and of the other symptoms which generally accompany the disease. In many cases there is reason for encou agement to expect that, with perseverance in proper treatment, the disease may be kept in abeyance for an indefinite period, and perhaps up to the physiological limit of human life. The prognosis, in this point of view, is favorable in proportion to the age of the patient, the absence of complications, and the extent to which the amount of sugar in the urine is controlled by treatment. The ability to tolerate any important intercurrent affection is more or less impaired. Diseases, therefore, from which otherwise recovery might be expected, are apt to prove serious to patients affected with diabetes. The serious complications which are incident to the disease are pneumonic phthisis, gangrene of the limbs, and general dropsy. Albuminuria is not infrequently associated with glycosuria, and in some cases the grave effects of uræmia occur.

---

[1] Manual of Chemical Examination of the Urine in Disease, by Austin Flint, J M.D. Fifth edition. New York, 1878. This work contains a table showing the p centage of sugar in undiluted diabetic urine, represented by the degrees of the sc *on* the burette graduated in grains.

With our present knowledge, the most important part of the treatment, by far, relates to diet. The employment of drugs should be subordinate to the dietetic treatment. As soon as the existence of the disease is ascertained, the patient is to be placed on the anti-diabetic system of dietetics. This system consists in excluding starch and sugar, as far as possible, from the food. If it be carried out thoroughly and judiciously, there is generally at once considerable diminution in the quantity of urine and the amount of sugar. The sugar is often soon diminished to a trace, and it sometimes, within a short period, completely disappears. The objects are, reduction of the amount of sugar as far as possible, and, at the same time, promotion to the fullest practicable extent of healthy assimilation and nutrition. With reference to the latter object, the anti-diabetic diet must be made to meet the alimentary needs of the body; and, for this end, it must fulfil the requirements of appetite and digestion. The patient must tolerate and be satisfied with it. If the results be otherwise, it will not, and it should not, be persisted in. Success will depend on the proper combination, preparation, and variation of the articles of food. The range of diet is extensive, and, if judicious selections be made, pains being taken to render the articles acceptable to the palate as well as digestible, varying the selections from day to day, the restrictions are generally submitted to without being felt as a great hardship. In these points pertaining to the carrying out the anti-diabetic diet, lies the secret of its success.

A diabetic patient should be furnished with a dietary list, embracing all the articles which are allowed and those which are interdicted. Unfortunately, many patients are so situated as not to be able to avail themselves satisfactorily of the dietetic treatment. It is difficult to treat diabetic cases properly in hospitals. Persons living in hotels and boarding houses, or obtaining their meals at restaurants, labor under great disadvantages. Limited pecuniary means interfere with the treatment; and it requires so much care on the part of those who have charge of the *cuisine*, that not a few whose resources are ample enough, are imperfectly treated. In this disease the common belief, in the minds of patients, that it is to be overcome by drugs, is a detriment, because it stands in the way of a full appreciation of the importance of the dietetic treatment.

The articles of food and drink containing no starch and sugar, or a quantity so small as not to be practically important, are as follows:—

1. All kinds of meat and poultry (excluding liver), either boiled,

roasted, grilled, or in the form of soup or jelly, with any kind of seasoning or sauce which contains neither flour nor sugar.

2. Fish of every sort, inclusive of turtle and terrapin, lobsters, clams, crabs, shrimps, and oysters.

3. Eggs, cooked in any style, with the exception of sweet omelets or sweetened custards.

4. Cream, cheese, butter, buttermilk, and, in moderate quantity, milk.

5. Cabbage, lettuce, cucumbers, pickles, spinach, beet tops, tomatoes, sorrel, endive or chicory, radishes, mushrooms, cauliflower, Brussels sprouts, asparagus, truffles, dandelion, artichokes, oyster plant, celery stalk and root, spring onions, water cresses, and olives. The allowed vegetables may be eaten raw, boiled, fried, or made into salad.

6. Coffee and tea, with the addition of cream, and, if agreeable to the patient, glycerine may be used as a substitute for sugar.

7. Brandy, whiskey, and other spirits which have not been sweetened; claret and Burgundy wines, very dry sherry, and certain bitter ales which, on testing, are found to contain very little or no saccharine matter, the juice of lemons and limes in water. Restriction in the quantity of water is wholly unnecessary; indeed, it is injurious. The patient should not suffer from thirst.

8. Gluten bread, and bread made from finely ground bran, after Camplin's method. In the use of these substitutes for ordinary bread, much depends on the mode of preparation. They may be made palatable by the addition of eggs and butter, together with varying modes of preparation. Pavy's almond flour may be used for the sake of change. If these substitutes for wheaten bread become repulsive, thin slices of the latter toasted very much, and almost charred, are allowable in small quantity.

A gluten flour is prepared especially for the use of diabetic patients by the New York Health Food Company, containing only a very small quantity of starch, and making a very palatable bread. It has been used in a number of cases under the author's observation, and has proved extremely satisfactory. This article seems to meet the great desideratum, namely, a bread allowable, and satisfying that craving which often becomes imperative under the use of bran flour prepared after Camplin's method. It is more nutritious than the latter, and differs from the French flour in the retention of the cellulose. Bread made of it is eaten with relish by persons in health.[1]

9. Almonds, hazel-nuts, walnuts, and cocoa-nuts.

The following list embraces the articles of food and drink which are interdicted:—

1. Sugar. Senator states, on the authority of Kuelz, that the saccharine principle in manna (mannite), the fruit sugar, known as Fructose or Levulose, and Inuline may be taken by diabetics without the excretion of sugar being increased; also, that in some cases, but not in all, this statement holds true with respect to the sugar of milk. The same has been stated of glycyrrhizine. If these statements be borne out by clini-

---

[1] The flour and bread referred to may be obtained from the Health Food Company, at No. 74 Fourth Avenue, New York City.

cal observations, the use of these varieties of sugar will considerably diminish the reluctance to adopt the anti-diabetic diet.

2. Bread of all kinds, except those made of flour devoid of starch. Thin slices of ordinary bread, much toasted, are admissible if the different forms of bread which are allowable become repulsive. Every article of diet into which flour not devoid of starch enters, together with macaroni, vermicelli, rice, Indian corn, barley, oats, and all other starchy grains.

3. Potatoes, arrowroot, tapioca, and sago in any shape.

4. Peas and beans, beets, carrots, parsnips, and turnips.

5. The livers of all animals.

6. All saccharine fruits.

7. Spirits containing sugar, the sweet or sparkling wines, cordials, or liqueurs, the greater part of malt liquors.

The anti-diabetic diet should be rigidly enforced, provided there is marked improvement, not only as regards polyuria and glycosuria, but in nutrition, strength, and endurance. It should be persisted in indefinitely, or as long as improvement is progressive. If, however, the general condition of the patient be not improved, and especially if the diet become intolerable, it should be modified. The chief obstacle, as far as concerns the resolution of the patient to adhere to it, has hitherto been the craving for bread. This obstacle appears to have been in a great measure removed by the introduction of the gluten flour prepared by the New York Health Food Company. Aside from bread, the diet can be made, with sufficient resources and care, endurable, to say the least, by every one. The tolerance of the diet, as well as its effect upon the general condition, will depend greatly upon the ability and the pains taken to select, combine, vary, and prepare the articles allowed so as to render them both palatable and digestible. The failure to tolerate and be improved by it, in most cases, arises from either inability or inefficiency in carrying out fully the system of treatment. These difficulties may be irremovable. If the general condition suffer thereby, bread and perhaps other interdicted articles should be allowed. A diet under which nutrition, strength, and endurance either increase or are well maintained, although the urine may contain sugar in more or less proportion, is preferable to a diet which reduces the amount of sugar in the urine, but under which the general condition deteriorates. When under rigid dietetic treatment the quantity of urine and the specific gravity become nearly or quite normal, the sugar having disappeared or been reduced to a trace, bread containing starch and other interdicted articles may be allowed tentatively, watching the effect, and being governed thereby as regards their continued use.

Whenever trial is first made of any saccharine or starchy article of food, the urine should be examined three or four hours afterward, in order thereby to determine the effect upon the diabetic condition. The effect of each article should be tested in this way before adopting it as a constituent of the diet. This is a highly important practical rule. Bouchardat gives the varieties of dishes in the different courses, namely, potages, hors-d'œuvre, entrées, salades, rotis, entremets, dessert, all consisting of articles in accordance with a strictly anti-diabetic diet. This may be advantageously studied by the diabetic patient, and by those who may undertake to furnish an anti-diabetic *menu*.[1]

The disease is sometimes held in abeyance by a partial dietetic treatment. A middle-aged diabetic patient consulted the author about three years ago, the disease having existed for a year or longer. The urine contained sugar in considerable abundance. He had not been restricted to an anti-diabetic diet. He held a business position of responsibility, requiring frequent railroad travelling. He was compelled to obtain his meals much of the time at hotels and railroad stations, and it was impossible to carry out the dietetic treatment save to a limited extent. He has, however, continued his business, with an increase of responsibility, and, at the present moment, does not appear to be, nor consider himself, in ill health. Similar instances are not very infrequent.

Confining the patient for several weeks exclusively to a diet of skimmed milk has recently been advocated as a curative method of treatment. The reported instances of apparent cure are too few to establish its efficacy. Doubtless the quantity of urine and the amount of sugar are diminished under this treatment; and that, in some cases, the glycosuria has disappeared, the patient remaining free from this evidence of disease for a considerable period, is not to be doubted. This is true of many cases in which the anti-diabetic diet has constituted the sole treatment. Moreover, cases in which an apparent cure has been effected by a diversity of remedies, have, from time to time, been reported. On the other hand, there is abundant testimony that the skim-milk treatment has proved not only unsuccessful, but hurtful. The treatment does not commend itself as rational, and the verdict of clinical experience is against it.

As regards medicinal treatment, there are no remedies at present known which can be said to be curative in cases of diabetes mellitus. This is by no means saying that remedies are not often useful. As already stated, however, the use of drugs should always be subordinate to the dietetic treatment. Strychnia or nux vomica may generally be given with benefit. Chalybeates are beneficial if the patient be anæmic, or if there be general dropsy. The vegetable bitter tonics are of service if appetite and digestion be impaired. Cod-liver oil is useful if well tolerated, its usefulness probably consisting in its being an easily digested form of fatty food. The treatment with opium or codeia, as advocated by Pavy, doubtless contributes to the comfort of patients, and it is indicated when, as is sometimes the case, patients suffer much from pain in the limbs, or great restlessness preventing sleep. It diminishes the polyuria and glycosuria; but it must impair, more or less, appetite and digestion, being, moreover, open to objection from the formation of the opium habit.[2] The bromides are of service only as promoting tranquillity of the nervous system. The iodide of potassium lessens the amount of sugar in the urine, but the effect otherwise is not favorable. Rennet, lactic acid, and yeast have been advocated on theoretical grounds; but clinical experience has failed to furnish evidence that they have an important influence upon the disease. The author has met with a case in which yeast was relied upon as a remedy, the disease being non-progressive for many years; but, in view of its unsuccessful employment in other cases, it seems fair to conclude that the favorable course of the disease in that instance is to be otherwise explained. Alkalies, in some cases, seem to have a favorable influence on the disease, at least so far as the glycosuria is concerned. Unless used with circumspection, however, their effect otherwise may be injurious.

---

[1] De la Glycosurie ou Diabète Sucré, par A. Bouchardat, note xxxiii., Paris, 1875.

[2] For an illustrative case treated with opium by Pavy, *vide* Trans. Clinical Society of London, vol. ii., 1869. Also, case reported by Dr. Henry Thomson, in ibid., vol. iv., 1871.

In estimating the effect of medicinal treatment, attention should not be directed exclusively to the urine. A remedy may diminish notably the quantity of sugar contained in the urine, while its effect upon the general condition of the patient is injurious. The question, therefore, in regard to the usefulness of different remedies is, not alone how much less saccharine the urine is rendered thereby, but, also, do they contribute, or not, to improvement in other respects? An over-estimate of medicinal, has doubtless often proceeded from an under-estimate of dietetic, treatment, the latter generally to a greater or less extent being associated with the use of remedies. Here, as in relation to other diseases, from the fact of numerous different remedies having been advocated as efficacious, the inference may be drawn that their apparent usefulness was attributable in a great measure to other causes. In conclusion, the trial of different remedies in treating diabetes mellitus must be left to the judgment of the practitioner, and the indications for medicinal treatment are to be interpreted according to the varying circumstances proper to individual cases.

Measures to maintain warmth and the functions of the skin are especially important in this disease.

Diabetes mellitus, in cases which are rare exceptions to the general rule, runs a rapid course, ending fatally within a few weeks. The disease in these cases has been distinguished as acute. In the case of the late lamented Professor Alpheus B. Crosby, death took place within a very short period after the existence of diabetes was ascertained. In this case disease of the kidneys became developed, and the immediate cause of death was uræmia. It is probable that the brief duration is due to a renal complication in certain of the cases of the so-called acute disease. In chronic cases, disease of the kidneys is apt to occur, and the diuresis due to the diabetic affection seems sometimes to afford protection against uræmia.

Diabetes Insipidus.

The diagnostic feature which distinguishes this from the disease just considered, is an excessive abundance of water in the urine, or hydruria. Considering the name diabetes insipidus as denoting an individual affection, however, hydruria is not sufficient to constitute it. Aside from the occurrence of the latter, temporarily, in nervous disorders, more especially hysteria, it is a symptom in certain cases of renal disease. In order to constitute diabetes insipidus, affections of the kidneys are to be excluded. This has not always been done by medical writers, because the opinion has been held that the renal disease is secondary to the diabetes, a pathological view which may be correct, but its correctness is not always determinable in individual cases. The collections of cases analyzed by Roberts and others are open to criticism on this score.

The affection now generally designated diabetes insipidus exists when there is a persistent, notable increase in the quantity of urine, the specific gravity extremely low (1.001 to 1.007), albumen and renal casts being absent. This statement does not exclude one liability to error in diagnosis. Hydruria may exist without either albumen or casts in cases of wasting of the kidneys incident to hydronephrosis. The author has reported a case of this kind, which was incorrectly diagnosticated diabetes insipidus.[1]

The quantity of urine varies much in different cases. It may exceed from ten to twenty times the average amount in healthy persons. Thirst (polydipsia) is always a concomitant symptom, and is proportionate to the increased quantity of urine. It is questionable in some cases whether the polydipsia is dependent on the hydruria, or *vice versâ*. The craving for fluids may be such that, as in two cases observed by Dickinson, patients being prevented from obtaining other liquids, will drink their own urine. As the urine had a specific gravity of only 1.002, and therefore contained no more extraneous matter than ordinary spring water, it was capable of quenching thirst, and, as Dickinson remarks, the act was only open to æsthetic objection. Inasmuch as in no other affection would this statement hold true, he considers the act as almost pathognomonic. This author cites the case of the wife of a French cobbler, whose earnings did not suffice to keep her in water. She drank four pails of water daily, the price of which was twelve sous.

In some cases of diabetes insipidus there are no symptoms of disease other than diuresis and thirst. Appetite, digestion, nutrition, muscular strength, together with other functions, are not materially impaired; the patient suffers only from the inconvenience of drinking, and voiding urine so frequently. The gravity of the affection depends on cerebral lesions with which, in a certain proportion of cases, it is associated, and on the liability to the development of renal disease. That the affection is sometimes purely functional, would seem to be a fair inference from the fact that, in a minority of cases, it ends in recovery after a few weeks or months, and that it has been observed to cease with recovery from an intercurrent disease. In the majority of cases it is persistent, not destroying life *per se*, but death taking place either from the cerebral lesions which are considered as causative of the affection, from induced disease of the kidneys, or from causes with which it has no pathological connection.

Treatment of Diabetes Insipidus.

The dietetic treatment of diabetes mellitus is in no wise applicable to diabetes insipidus. The latter claims no special restrictions in diet There is no advantage in limiting the amount of fluids ingested. On th contrary, the patient is rendered thereby uncomfortable, irritable; an the consequence is otherwise hurtful. In this statement it is assumed that the craving for drink is secondary to, and dependent on, the diuresis. Opium and other remedies which diminish the quantity of sugar in the urine have no good effect in diabetes insipidus.

---

[1] *Vide* Principles and Practice of Medicine. Fourth edition, page 838.

As the immediate cause of the hydruria is supposed to be an abnormal dilatation of the renal capillaries, remedies given with a view to produce contraction of these vessels are rationally indicated. Professor Da Costa has reported a case in which the fluid extract of ergot, in doses of a drachm, increased to two drachms, thrice daily, was followed by immediate improvement and recovery within a period of two months. The patient during the improvement had an attack of slight pleurisy, and it is possible that this intercurrent affection may have had an agency in the recovery.[1] Professor Tyson has reported a case in which ergot given in the same doses failed to produce any good effect. In this case gallic acid, grs. xv., three times daily, diminished considerably the polyuria, the patient passing from under observation after this remedy had been employed for a short time. The report of Professor Tyson does not embrace the results of examinations of the urine for the evidences of renal disease.[2] Further trial of these remedies is desirable. Ringer has found ergotin efficacious.[3] Valerian, advocated especially by Trousseau, given in large doses, has been found useful in a number of cases by different observers. Senator states that the constant current on the spinal column and renal region has been employed successfully by a German physician, Kuelz.

Aside from treatment addressed to the vessels of the kidneys, therapeutic indications are to be derived from symptoms and the morbid conditions with which the affection may be associated.

---

[1] *Vide* Transactions of the College of Physicians of Philadelphia. Third Series, vol. i., 1875.

[2] *Vide* Transactions of the College of Physicians of Philadelphia. Third Series, vol. ii., 1876.

[3] *Vide* Senator in Ziemssen's Cyc., Am. edition, vol. xvi. page 1038. Several communications have appeared in different medical journals since the publication of Prof. Da Costa's article reporting success from the employment of ergot.

SECTION FIFTH.

DISEASES OF THE NERVOUS SYSTEM.

PRELIMINARY OBSERVATIONS.

Symptoms relating to general sensibility: pain, cephalalgia, rachialgia, hyperæsthesia, cutaneous anæsthesia, analgesia, muscular anæsthesia—Treatment of anæsthesia—Metalloscopy—Symptoms relating to the special senses: vision and the eye, audition, olfaction, gustation—Symptoms relating to the mental faculties: coma, somnolency, delirium, feebleness of mind, aphasia—Symptoms relating to muscular movements: motor paralysis, treatment of motor paralysis, ataxia, convulsions or spasms, cramps, contractures, tremor, reflex movements.

THE symptoms which are especially diagnostic of diseases of the nervous system, relate to general sensibility, the special senses, the mental faculties, and muscular movements. In the observations preliminary to this section, the topics to be considered will be taken up in the foregoing order.

SYMPTOMS RELATING TO GENERAL SENSIBILITY.

Pain.

The difficulty in giving a satisfactory definition of pain is of little practical consequence, inasmuch as no one is at a loss to comprehend the meaning of the term. Nor is there, practically, any obscurity in the language generally used to express different kinds of pain. Such adjectives as burning, lancinating, dull, aching, griping, shooting, convey ideas sufficiently distinct, because almost every one, in greater or less degree, has experienced the varieties thereby expressed. In the discrimination of certain diseases, the kind of pain which exists has not an inconsiderable diagnostic significance.

Pain in any part of the body is, of course, proof of the presence of sensory nerves in the part; but it is by no means confined to diseases which are classed among those of the nervous system. It is rarely wanting in acute inflammatory affections wherever situated, and it accompanies often spasmodic affections. It is the chief characteristic of neuralgic affections. Pain localized in a part, and especially referred to the course of a nervous trunk, if inflammation or any appreciable lesion be excluded, is pathognomonic of neuralgia. It is important, however, to bear in mind that a morbid condition giving rise to pain in a particular situation, is not always seated where the perceptions of patients localize it. Familiar examples are the pain referred to the knee in diseases of the hip; to the penis in cases of stone in the bladder, or of renal colic, etc. An irritation seated at or near the central connection of a nerve-trunk may occasion pain which is referred to a situation more or less remote. In a case under the author's observation of embolic plugging of the external iliac or femoral artery, an intense pain was felt in the heel. These facts are consistent with what often occurs after an amputation of a limb, namely, the patient suffers pain seemingly seated in the part which has been removed. It is, therefore, an important practical injunction to seek, in certain cases, for causative conditions between the part which appears to be the seat of pain, and the central portion of the nervous system.

Pain is a subjective symptom, and its degree, as well as its character, can only be ascertained by the description of the patient, together with the expression of the countenance and other manifestations. The latter in children too young to describe pain, often suffice to show not only the existence and the kind of pain, but the situation of the disease which occasions the pain. As different persons endure pain quite differently, the degree of pain may be either over or under-estimated by the physician from its manifestations and the patient's statement. Moreover, patients are sometimes led to exaggerate, as regards this symptom, in order to provoke pity or excite sympathy. Pain may be simulated. The judgment and tact of the physician are often called in requisition to form a correct opinion as to the degree of pain, from his knowledge of the patient, the associated symptoms, and the extrinsic circumstances of the case.

Pain in the head (cephalalgia, headache) is an important symptom of intracranial inflammatory affections. It is, however, by no means distinctive of these. Non-inflammatory headache is one of the effects of uræmia, and is incident to other toxhæmic conditions. It is more or less prominent as a symptom in essential and in symptomatic fever. Cephalalgia is caused by conditions which are not fully understood, and is, therefore, to be reckoned among the functional diseases of the nervous system, or the neuroses. It will be considered as one of the individual affections embraced under that head. As a symptom of inflammation of the brain or its meninges, it is always to be taken in connection with other symptoms denoting an inflammatory condition. It is especially a prominent symptom in acute cerebral meningitis and active congestion of the brain. It is accompanied by a sense of tension, and is always bilateral. Unilateral headache referred to the supraorbital or cervico-occipital nerves, is diagnostic of neuralgia affecting those nerves. Other evidences of neuralgia are present, and the symptoms denoting inflammation are absent. Pain localized within a circumscribed space, and compared by the patient to a sensation as if a nail were being driven into the skull, the pain occurring paroxysmally, is characteristic of hysteria (clavus hystericus). A persistent localized pain, always referred to the same situation, is a diagnostic symptom in cases of tumor of the brain, with circumscribed meningitis. In tubercular meningitis affecting children, the occurrence of lancinating pains from time to time, causing a sudden cry, is highly diagnostic.

Pain in the back, either diffused or localized, is a symptom in cases of spinal meningitis and of meningo-myelitis. It has not, however, much diagnostic import unless associated with other symptoms, and especially paraplegia or general spinal paralysis. It occurs in other pathological connections, namely, aortic aneurism, uterine affections, acute parenchymatous nephritis, lumbago. It is incident to muscular debility from various causes.

The pain in neuralgia referable to a nervous trunk, varies in degree within wide limits, and is often distinguished by its shooting in directions corresponding to the affected nerve and its branches. It is further distinguished by its occurrence either in paroxysms which sometimes observe a law of periodicity, or in notable exacerbations. It is diagnostic of a purely neuralgic affection whenever it is not attributable to inflammation or lesions.

Professor S. Weir Mitchell has described a peculiar burning pain (causalgia) of the palm of the hand and sole of the foot following gunshot wounds, the pain being accompanied with a glossy appearance of the skin. The author has met with a case in which an analogous pain was not preceded by any injury. The patient, a man aged about 25, had been confined to the house for six weeks in consequence of paroxysms of pain in the sole of the foot, excited by walking or even standing. He described the pain to be like that from a burn. The paroxysm lasted about an hour. Relief was obtained by holding the feet before a fire. He had the same kind of pain, but much less severe, in the palms of the hands. There was no tenderness of the surface, redness, or swelling. He had no fever, no disturbance of digestion, and no other ailment. He had not had gout. He had been treated with quinia and various narcotics. The subsequent history of the case has not been ascertained.

A sensation of heat not amounting to pain, but annoying, occurring independently of any actual increase of temperature or redness, is a rare neuropathic symptom. A patient who consulted the author, had for sixteen months almost daily been annoyed by a sense of heat extending from the waist over the lower limbs. The sensation usually began in the middle of the forenoon, and passed off during the night. The patient was a woman about 70 years of age, and in all other respects was apparently in good health. A variety of remedies, together with baths, had been tried without benefit.

Hyperæsthesia.

Hyperæsthesia is a morbid increase of the general sensibility of a part; in other words, an abnormal sensitiveness or tenderness to the touch. It may, or may not, be accompanied by pain irrespective of tactile impressions. The term hyperalgesia, denoting an undue sensitiveness to pain, as distinguished from hyperæsthesia, expresses a distinction which is correct, but of not much practical consequence. For an example, pressure upon one of the tender points found in cases of neuralgia, often causes more or less pain which may continue for some time after the pressure is made, showing undue sensibility both to touch and pain. These tender points afford a good illustration of hyperæsthesia. They are highly diagnostic of neuralgia affecting nervous trunks. This has been seen in treating of dorso-intercostal neuralgia in connection with diseases of the respiratory system (*vide* page 146). The affection described by Marion Sims under the name vaginismus is a striking example of hyperæsthesia affecting a mucous surface. The hyperæsthesia, however, occurring in connection with nervous diseases is chiefly cutaneous. Hyperæsthesia of the abdominal integument simulating peritonitis has been referred to in connection with the diagnosis of that disease (*vide* page 297). The integument covering the chest and the limbs is sometimes exquisitely sensitive to the touch. The patients are generally women who are anæmic, and the hyperæsthetic condition is often associated with hysterical manifestations. A capital diagnostic feature is this: The surface is sensitive to mere contact or slight pressure with the ends of the fingers, whereas firm pressure with the palm of the hand gives less pain, and is perhaps borne with little or no inconvenience. That the cause of the undue sensitiveness is in part mental, in some instances, is shown by the fact that it is notably less when the patient's attention is diverted. In this way, inflammation as the cause of the tenderness is excluded.

Circumscribed hyperæsthesia is demonstrated by means of a feeble current of electricity. It is also shown by passing over the part either a sponge heated with hot water or a piece of ice. The latter methods have been employed to render evident tender points by the side of the spinal column in cases of neuralgia and what has been called spinal irritation. Pressure with the fingers, however, answers sufficiently for all practical purposes.

Cutaneous hyperæsthesia is never to be regarded as an individual affection, but always in the light of a symptom; and the treatment is to be directed to the morbid conditions with which it is symptomatically connected. Soothing applications, and protection by plasters or other means against painful contact with clothing, etc., are often indicated.

Perversions of general sensibility, as denoted by such sensations as numbness, formication, itching, etc., are distinguished by the term Paræsthesia. It will suffice to notice these in connection with the diseases in which they occur.

Cutaneous Anæsthesia. Analgesia.

The term anæsthesia denotes either diminution or abolition of general sensibility; in other words, sensory paralysis. The differences in the degree and the extent of the anæsthetic condition may be expressed by the adjectives applied to motor paralysis. It is *incomplete* when the sensibility is more or less diminished, and it is *complete* when there is absence of sensibility. It is *local* if confined within circumscribed limits; *partial* if it extend to a considerable portion of the body, for example, one lateral half or both lower limbs; and *general* if all the members are affected.

An important distinction is between diminution or loss of the sensibility to painful and to tactile impressions. There may be loss of sensibility in respect of pain, while the tactile sense is not paralyzed. Paralysis of the sense of pain is distinguished as *analgesia*. Clinical observation establishes this distinction, and it is intelligible if it be true, as stated, that painful and tactile impressions are conveyed to the sensorium by different paths in the spinal cord. Other distinctions are of less practical importance, namely, paralysis affecting the sensation of temperature and what is known as the muscular sense. The latter is to be distinguished from sensibility of the skin. Cutaneous and muscular anæsthesia require to be noticed separately.

In order to ascertain the existence and the degree of impairment of cutaneous sensibility as regards pain, pricking and pinching the skin are ordinarily resorted to. These means suffice for practical purposes. A strong faradic current of electricity may also be employed. Aside, however, from its being in general less readily available, the latter requires more care in order to avoid error. Tactile sensibility is measured by ascertaining the minimum distance at which two points of contact with the skin are recognized as distinct from each other. The tactile sensibility is impaired in proportion to the distance between the two points which is requisite in order for their recognition. An instrument called the æsthesiometer may be employed for this purpose. The common compasses used in drawing, tipped with sealing-wax or cork, answer; and, if these be not at hand, two pen-holders, pencils, or pins will suffice. The delicacy of tactile sensibility, as thus measured, varies much in different parts of the body. The greatest delicacy is at the tip of the tongue, where two points of contact, the distance between them being only half a line, may be recognized. The palmar surface of the fingers ranks next. On the trunk, behind, the distance required for the recognition of the two points is thirty lines, and it is the same over the middle of the arm and leg. Of course, the normal differences in different parts of the body must be taken into account in determining an abnormal condition; and, as the normal differences probably vary considerably in different persons, allowance is to be made for these variations. If the anæsthesia be unilateral, it is to be determined by a comparison of corresponding situations of the two sides. It is not certain, however, that, in all healthy persons, there is an exact equality of the tactile sensibility on the two sides. It may be increased by education or habit, and hence the fingers of the right are apt to have more delicacy of touch than those of the left hand. It follows that the disparity between the two sides must be considerable in order to be regarded as pathological. A disparity between the tactile sensibility of the two hands is roughly estimated by causing the patient to give, with the eyes closed, a description of objects placed in the palms. If the sensibility be much impaired, objects fall from the grasp unless held by the aid of vision, and occupations which require the delicate use of the fingers are difficult or impossible. If the sensibility of the feet be lost or much impaired, the patient does not feel contact with the ground in walking, and guidance by the eyes is necessary. In the vast majority of cases in which tactile sensibility is affected, there is impairment of the sensibility to pain (analgesia); and both are in most instances associated with diminished or disordered motility. This is true also of diminished sensibility to temperature and pressure.

The significance of cutaneous anæsthesia, with reference to the pathological conditions of which it is symptomatic, depends on its situation and extent.

General anæsthesia may be caused by anatomical changes incident to various intracranial affections, namely: cerebral meningitis, meningeal hemorrhage, sclerosis, and softening. Thus connected, it is always associated with other symptoms diagnostic of these affections. It is often more or less marked in the insane, associated with general motor paralysis. Cerebral disease being excluded, it denotes an affection of the upper portion of the spinal cord. It is induced toxically by alcohol, opium, and other narcotics, without complete coma. In this toxical effect consists the inestimable value of the inhalation of chloroform and other anæsthetic agents. Chloroform may destroy the sensibility to pain (analgesia) without abolishing tactile sensibility. In the anæsthetic condition, the knife of the surgeon is sometimes distinctly felt, although painlessly.

Unilateral motor paralysis from cerebral affections (cerebral hemiplegia), namely, hemorrhage, embolism, etc., may be accompanied by anæsthesia affecting the same side (hemianæsthesia); but in the majority of the cases in which the latter coexists, it is of transitory duration. Hemianæsthesia without hemiplegia is rare. When the anæsthesia, either with or without motor paralysis, depends on a cerebral affection, it will be likely to extend to the mucous membrane on one half of the tongue, mouth, soft palate, and the conjunctiva of one eye, the sensibility of the cornea remaining intact. The hemianæsthesia denotes that the intracranial affection extends to, or is localized in, either the pons Varolii, the optic thalamus, the crus cerebri or certain of its fibres within the hemisphere. It is claimed that the latter is especially the seat of the sensory paralysis.[1]

Cases have been observed of spinal hemiplegia with hemianæsthesia of the side opposite to that of the motor paralysis. The morbid condition in these cases is limited to the lateral portion of the cord which corresponds to the hemiplegic side, the anæsthesia being on the opposite side in consequence of the decussation of the sensory fibres within the cord. In hemianæsthesia of spinal origin, the anæsthesia does not extend to the tongue, mouth, false palate, and conjunctiva. Motor paralysis of one of the lower limbs from spinal disease below the dorsal vertebræ, may be accompanied by sensory paralysis of the opposite limb.

Paraplegia affecting the lower limbs is accompanied by anæsthesia, if the spinal affection obstruct the sensory fibres, or involve the gray matter of the cord. The sensory paralysis affects tactile sensibility, or sensibility to pain, or both. Cases of sensory, without motor, paralysis of the lower limbs are rare. In a case which came under the author's observation, the patient a man aged seventy years, there was almost complete loss of sensibility in both limbs, the muscular power and the ability to co-ordinate muscular movements remaining intact. He suffered daily from paroxysms of severe neuralgic pain in the affected limbs, the situation of the pain not constant but shifting. The severity of the pain required the use of opiates. Otherwise the health was good. Considerable improvement, as regards the anæsthesia, had taken place under the employment of the constant current of electricity.

---

[1] *Vide* Maladies du Système Nerveux, par le Dr. J. Grosset, Paris, 1878.

More or less anæsthesia of the lower, and sometimes of the upper, limbs will be embraced among the symptoms of an affection of the latero-posterior portion of the cord, giving rise to locomotor ataxia.

Cutaneous anæsthesia, either general, partial, or local, is among the great number of symptoms called hysterical. General anæsthesia accompanies sometimes paroxysms of hysteria. Hemianæsthesia is less rare. The left side more frequently than the right is affected. The anæsthesia may extend to the mucous membrane of the mouth, throat, and eye on the affected side. In the greater number of instances the anæsthesia is local, the back of the hands and the ankles being its most frequent situations. It may be mentioned in this connection that vaginal anæsthesia and loss of sexual excitability are among the varied phenomena of hysteria. The author has met with an analogous temporary condition in man, the sexual act being consummated without the normal sensations which usually accompany the orgasm.

Local cutaneous anæsthesia, not hysterical, and exclusive of its occurrence as a consequence of local extrinsic causes, such as cold, is the result of a morbid condition of some kind, seated somewhere in the course of a particular nerve, or in the spinal cord, or, again, in the brain. It may be a symptom of inflammation affecting a nervous trunk (neuritis), of the pressure of a tumor, or injuries. In most instances, motor paralysis accompanies the sensory paralysis, the causes affecting the fibres of motion as well as those of sensation. The author has reported a case in which complete anæsthesia was limited to the rectum and anus, surgical operations in this situation being devoid of pain, and the patient being unconscious of any desire for defecation. In this case the anæsthesia resulted from a fall from a considerable height, the fundament receiving the concussion. The paralysis was permanent.

Of the cranial nerves, paralysis of the fifth pair, or the trigeminus, is of especial interest and importance. The anæsthesia may be limited to the parts to which is distributed one of the branches of this nerve, or it may extend over the area of its entire distribution. The latter shows that the nerve is affected by a lesion of some kind within the skull. The anæsthesia then embraces one side of the face, including the temple and forehead, the conjunctiva and cornea of one eye, the mucous membrane of the nostril, lips, mouth, tongue, and pharynx on the affected side. Ulceration and perforation of the cornea are liable to occur. The nerves of smell and of taste are affected. The nature of the affection which causes paralysis of this nerve is to be inferred from the concomitant cerebral symptoms.

Muscular Anæsthesia.

The existence of muscular sensibility is shown by the pain felt in cramp, and when a muscle is struck with a certain force, as in the common trick in boyhood of striking the biceps. A faradic current of electricity, if sufficiently strong, produces a muscular pain. Muscular anæsthesia is thus readily made evident by means of electricity. Diminution, or the loss of electro-sensibility will enter into the consideration of motor paralysis. Impairment of what is known as the "muscular sense" explains in part the inability to maintain the equilibrium of the body in standing with the eyes closed—a diagnostic symptom in cases of locomotor ataxia.

Treatment of Anæsthesia.

The chief therapeutical indications, in cases of anæsthesia, relate to its causative pathological conditions. These are numerous and varied. In conjunction with measures which fulfil causal indications, it is an object of treatment to restore the normal sensibility. This is sometimes the sole object, because the anæsthesia may remain after the causative conditions are removed; and, moreover, in some cases, *e. g.*, of hysterical anæsthesia, the causation is not understood. The treatment addressed directly to the anæsthesia consists of different measures of local excitation, the most potential of which is localized electrization. The electrical brush is recommended as the most efficient electrode. Here, as in other connections, for details respecting the employment of electricity, the reader is referred to works treating specially of electro-therapeutics.

Of the efficiency of electricity, Drs. Beard and Rockwell state as follows: "For the curable cases of cutaneous anæsthesia, faradization is a specific, if any remedy can be said to be specific for anything. Even cases that depend on incurable central lesion may improve very decidedly under treatment. In cases of paralysis of motion and sensation, the sensation may be partially or completely restored under electrical treatment, even if the loss of motion remain unchanged."[1]

Stimulating applications other than the electrical are useful, and may suffice if electricity be not available. Various embrocations may be employed, taking care not to produce undue irritation. Friction alone is often of much use. An effective method of excitation is to employ in alternation hot and cold douches to the anæsthetic part.

If anæmia exist, ferruginous tonics are indicated, together with a nutritious diet. The improvement of appetite, digestion, and nutrition, if these be defective, by medicinal and hygienic means, constitutes an important part of the treatment. If the sensibility be lost or greatly diminished, the affected parts should be carefully guarded against continued pressure in order to avoid ulceration or sloughing; and cleanliness is to be strictly enforced.

In connection with the treatment of anæsthesia, the modern doctrine of metalloscopy and metallo-therapeutics may be alluded to, as enunciated by a French physician, Burq, reported upon favorably by Charcot and others, after experimental observations, and adopted by Westphal. According to Burq, owing to certain mysterious affinities, there exist in different persons intimate relations of sensibility to different metals, and, having ascertained by experiment each person's idiosyncrasy in this respect, a curative influence is obtained from the particular metal to which the person stands in an intimate relation. Observations have been made especially as regards the effect of applications of pieces of metals to the skin in cases of anæsthesia. It has been repeatedly observed that the anæsthesia disappeared within and around the spaces where the metals were applied, and, in some instances of hemiæsthesia, the sensibility returned over the whole of the affected side. Without introducing here further details, that this method of treatment, which is a renewal, in a modified form, of the use of the metallic tractors of Perkins, is followed by the effects observed, need not be doubted. It is easy to account for their production by a reflected mental influence. The evidence of a curative agency can hardly be greater than was brought to bear upon the merits of "Tractoration" or "Perkinism" nearly a century ago.[1]

---

[1] Op. cit.

The effect of expectation, as a curative agency, is often strikingly manifested in both the regular and irregular practice of medicine. Here is a factor of great power in therapeutics. The extent to which it may be properly employed, and the methods of its employment in legitimate medicine, must be left to the judgment of the conscientious physician, to be determined by the circumstances in individual cases.

SYMPTOMS RELATING TO THE SPECIAL SENSES.

The more important of the symptoms falling under this head relate to vision and the eye. The diseases of the eye form a special department of medicine, and they are referred to in this work so far only as they are symptomatic of affections seated elsewhere. Symptoms relating to this sense and its organ are of considerable diagnostic importance as representing morbid conditions of the nervous system. Audition, olfaction, and gustation are comparatively of small importance in this point of view.

Vision and the Eye.

The diagnostic symptoms derived from the eye in diseases of the nervous system are, increased sensibility to light; the loss, impairment, or perversions of vision; abnormal variations of the pupil; paralysis of one or more of the orbital muscles; convulsive or spasmodic movements of these muscles, and marked appearances of the fundus oculi disclosed by the ophthalmoscope.

Notable increase of the retinal sensibility (optic hyperæsthesia) characterizes the first stage of acute meningeal inflammation, and active hyperæmia of the brain. There is intolerance of light (photophobia).

---

[1] For a concise account of Burq's doctrine, and of clinical observations relating thereto, *vide* London Medical Times and Gazette, September 21, 1878. *Vide*, also, lecture by Charcot, in the London Lancet, February 2, 1878.

It occasions pain, and the patient strives to protect the eyes against it. Young children manifest the pain which it causes by crying, and by a frowning expression. The latter symptom has much diagnostic value, taken in connection with other evidence of the affections named, and excluding diseases of the eye.

Total loss and more or less impairment of vision (amaurosis, amblyopia) occur in a certain proportion of the cases of different cerebral affections, more especially in the advanced stage of basilar meningitis, and in tumors of the brain. They occur, also, in some cases of spinal disease. The defective sight may be either unilateral or bilateral; oftener the latter. In order that they may be considered as symptomatic of intracranial disease, primary affections of the eye are to be excluded, and other symptoms referable to either the brain or spinal cord, must coexist. Renal disease and diabetes are also to be eliminated. Moreover, in connection with the loss or impairment of vision, the appearances ascertained by means of the ophthalmoscope are to be ascertained. The diagnostic significance of half vision (hemiopia), double vision (diplopia), and other perversions of vision, calls for the same requirements. Floating specks or motes, well known as *muscæ volitantes*, are common, independently of any well-defined, important disease within either the eye or the cranium. Patients are apt to be needlessly uneasy as regards the import of this symptom.

The marked changes of the pupils are dilatation (mydriasis), contraction (myosis), sluggishness, that is, unnatural slowness of contraction under the stimulus of light, and immobility. The changes may be limited to one eye or present in both eyes; and both pupils may be affected, but unequally. In order for morbid appearances of the pupil to be symptomatic of an intracranial or spinal affection, disease of the iris must be excluded. It is also to be borne in mind that the normal size of the pupils varies in different persons, and that the two pupils may not be alike as a sequel of iritis, pressure upon the cervical sympathetic nerve, or as a natural disparity. Contraction of the pupils of both eyes, with notable intolerance of light, is a symptom of meningitis in its first stage. It is stated that notable contraction is an almost constant symptom in cases of extravasation of blood into the pons Varolii. Dilatation, sluggishness, and immobility are symptomatic of the pressure of liquid effusion or other morbid products, especially at the base of the brain, in an advanced stage of meningeal inflammation, and of optic neuritis or atrophy secondary to tumors and other cerebral affections. Notable dilatation of the pupils occurs at the commencement of an epileptic paroxysm. The pupils are generally dilated in chorea. Dilatation of the pupil of one eye, in connection with other symptoms of cerebral disease, points to unilateral disease of brain. It occurs with and without paralysis of the third cranial nerve. In cases of doubt concerning the existence of cerebral disease, the absence of any morbid appearance of the pupil is a negative point of importance, although by no means sufficient for its exclusion.

The effects of toxical agents on the pupils are not infrequently involved in diagnosis. In poisoning by opium the pupils are contracted. On the other hand, belladonna, stramonium, and hyoscyamus cause dilatation.

In alcoholic intoxication the pupils are dilated. These effects are to be borne in mind with reference to determining, by symptoms, the causation of coma, especially in cases the previous history of which is unknown.

Paralysis of one or more of the muscles within the orbit may be symptomatic of either intracranial or spinal disease. The existence of paralysis is in general easily ascertained by an obvious deviation from the normal parallelism, by the difficulty of moving the eyeball in certain directions, and by diplopia. It is also easy to ascertain the particular muscle or muscles paralyzed, and, consequently, the cranial nerve or nerves involved. In paralysis of the *motor oculi communis* (the third nerve), the upper eyelid drops (ptosis); the eye turns outward (external strabismus), with slight protrusion; movements cannot be made upward and downward, and the pupil is dilated. Ptosis sometimes occurs as an isolated affection. In paralysis of the rectus superior there is inability to turn the eye upward, and it deviates downward. Ptosis not infrequently coexists. Paralysis of this muscle involves a branch of the third cranial nerve. This is true also of paralysis of the inferior rectus, the internal rectus, and the inferior oblique muscle. Paralysis of the inferior rectus impairs the ability to move the eye downward, and it deviates upward. Paralysis of the internal rectus causes the eye to deviate outward, and it cannot be moved in an inward direction. Paralysis of the inferior oblique muscle does not occasion notable disturbance of motility, but slight deviation occurs downward and inward. Paralysis of the inferior oblique muscle (patheticus, trochlearis, or fourth nerve), like that of the inferior oblique, which it antagonizes, interferes but little with the movements of the eye, and causes a slight inward and upward deviation. Paralysis of the external rectus muscle (motor oculi externus or sixth nerve) causes deviation of the eye inward (converging strabismus) and inability to rotate it outward.

Paralyses of the muscles of the eyeball may be caused by intraorbital affections which are to be excluded in forming the opinion that the double vision, deviations, and impaired motility are symptomatic of cerebral or spinal disease. The paralysis sometimes occurs and disappears under circumstances which denote only a functional affection. This statement applies especially to paralysis of the external rectus muscle. The significance as symptoms of disease of the brain or spinal cord depends on an association with other symptoms pointing thereto, such as localized pain, delirium, convulsions, paralysis affecting other muscles, *e. g.*, hemiplegia or paraplegia, locomotor ataxia, etc. The fact that a patient has had syphilis is also to be taken into account, inasmuch as intracranial syphilitic growths, giving rise to paralysis of orbital muscles, are of not infrequent occurrence.

Paralysis limited to one or more of the muscles of the eye may be the first marked symptom pointing to intracranial disease. It may be a precursor of a grave affection. The following case is illustrative of the latter statement: Paralysis of the muscles to which the third cranial nerve is distributed occurred suddenly, the patient being a woman aged 78 years. It was accompanied by cephalalgia, but without any mental disturbance or paralysis elsewhere. Three weeks afterward, apoplexy with left hemiplegia took place, causing death two hours after the attack. The paralyzed muscles of the eye were on the right side.

Convulsive movements of the orbital muscles cause the "rolling of the eyes" which occurs in cases of meningeal inflammation, especially in children. The strabismus in paroxysms of epilepsy, and in epileptiform attacks, probably denotes, not muscular contraction from paralysis of antagonizing muscles, but spasm. Rapid movements of the eyeball, alternating perhaps with fixedness, occur in hysteria. Opening and shutting the eyelids in quick succession (nictitation) is pathognomonic of an hysterical paroxysm. Lateral or vertical oscillatory movement (nystagmus) of the eyeball is an occasional symptom denoting grave disturbance of the nervous system. It is of frequent occurrence in cases of disseminated cerebral sclerosis. It has been observed in cases of cerebral hemorrhage. The author has observed it in cerebro-spinal meningitis. Constant oscillatory movements may be a natural peculiarity. The author has met with an instance in a young physician whose health was perfect and his vision unaffected. Abadie has described, under the name *Nystagmus des Mineurs*, this affection as occurring not infrequently among workmen in coal-mines.[1]

Conjoint lateral deviation of the eyes is a symptom of hemiplegia following an apoplectic seizure. The eyes are turned in a direction opposite to the paralyzed side, that is, to the side corresponding to the cerebral lesion. Frequently the face is turned to the same side. This symptom is wanting when hemiplegia does not follow apoplexy. It disappears generally after a few days. Exceptionally it continues for days and even months.

Morbid appearances of the fundus oculi, disclosed by the ophthalmoscope, taken in connection with disordered vision, are important in their symptomatic relations with intracranial and spinal affections. In giving a brief synopsis of these, the author will follow mainly the treatise by Allbutt, which, as exemplifying candor and a philosophic spirit, is a model work. For details, which cannot be here introduced, the reader is referred to this treatise and that by Galezowski.[2] Diagnostic characters obtained by means of the ophthalmoscope will be mentioned hereafter in connection with the discrimination of different individual affections of the nervous system. The morbid appearances may denote simple hyperæmia, anæmia, ischæmia or "choked disks," optic neuritis, and atrophy. It is an essential requirement, in order that these conditions should be regarded as symptomatic of cerebral or spinal disease, that primary intraorbital affections be excluded.

Simple hyperæmia of the vessels of either the optic disk or the retina, or both, occurs in various pathological connections irrespective of cerebral disease, namely, as secondary to intraorbital affections, inflammation of the choroid, affections of the kidneys, alcoholism, exophthalmic goitre, and diseases of the heart. It denotes, however, in a very great number of cases, intracranial disease, such as meningitis, acute or chronic, tumor, and disturbances of the circulation associated with convulsions or mania. It is evidence of the hyperæmia being due to intracranial conditions if it be more marked in one eye than in the other.

---

[1] Nouveau Dictionnaire de Médecine et de Chirurgie, Paris, 1877, art. Nystagmus.

[2] On the Use of the Ophthalmoscope in Diseases of the Nervous System and of the Kidneys, etc., by Thomas Clifford Allbutt, M.A., M.D., London and New York.
Traité iconographique d'Ophthalmoscopie, par X. Galezowski, Paris, 1876.

An anæmic condition appears to enter but little into the symptomatology of intracranial diseases. Some observations have shown that, at the commencement of an epileptic paroxysm, there exists anæmia; a fact which affords support to the view that the primary pathological condition is spasm of the cerebral arteries. In embolism of the central artery of the retina, the primary effect is notable anæmia associated with sudden loss of vision of the affected eye. In ophthalmoscopic observations it is important to distinguish from simple anæmia atrophy of the optic disk.

Mechanical congestion of the veins (ischæmia papillæ, "choked disks") denotes obstruction to the return of blood from the ophthalmic veins. This occurs in cases of meningitis and in tumors of the brain. It is apt to be confounded with optic neuritis, from which it is not readily discriminated. The two conditions are often associated, and they proceed from the same causes. The congestion may give rise to œdema and hemorrhagic extravasations. Vision is more or less impaired, but often in a much less degree than would be supposed *a priori* from the ophthalmoscopic appearances.[1]

Optic neuritis, neuroretinitis, and perineuritis are terms which denote an inflammatory affection having its point of departure probably in the interstitial or connective tissue. Commencing in the nervous trunk, it is also called descending neuritis. The appearances due to congestion are here secondary, whereas in "ischæmia papillæ" the congestion is primary. Excluding the cases in which optic neuritis is primarily orbital, it is symptomatic of chronic meningitis at the base of the brain, either simple or tuberculous, and of tumors with secondary meningeal inflammation. In the diagnosis of the latter it is especially important. In proportion to the proximity of tumors to the optic tract, the inflammation descending thence to the nerve and disk, optic neuritis occurs sooner and more frequently. The neuritis may be binocular or monocular; the former being much the more frequent. It occasions, of course, either loss or more or less impairment of vision.

Atrophy of the optic disk is consecutive to ischæmia and neuro-retinitis, but it occurs independently of these; in the latter case it is distinguished as primary. Primary atrophy is a symptomatic event in cases of sclerosis of the latero-posterior column of the spinal cord (locomotor ataxia), and in cerebro-spinal multiple sclerosis. It may be caused by a tumor, or inflammatory exudation pressing upon fibres which compose the optic nerve. The atrophy may be limited to one eye, or, more frequently, both are affected. As a rule, the degree of atrophy is greater on one side than on the other. According to its degree, vision is impaired or lost.

Observations appear to show that tubercles, recognizable by means of the ophthalmoscope, are developed in the choroid coat, as a rule, in cases of acute miliary tuberculosis, and in a certain proportion of cases of phthisis, but they are rarely found in this situation in cases of tuberculous or granular meningitis.

---

[1] The connection of the "choked disk" with brain disease is discussed by Dr. Edward G. Loring in an able paper contained in the October (1875) number of the Am. Journ. of Med. Sciences.

The intra-ocular appearances symptomatic of cerebral and spinal diseases, are to be distinguished from retinal changes characteristic of renal disease, syphilis, diabetes mellitus, and leucocythemia. The changes incident to each of these affections are distinctive, and by the practical ophthalmoscopist readily discriminated.

Audition.

The loss, impairment, or aberrations of the sense of hearing are not infrequently symptomatic of diseases of the nervous system, that is, they occur independently of any appreciable disease of the organs of audition, and are associated with other symptoms which denote intracranial disorder. Intolerance of sound, as of light, is a symptom of acute meningeal inflammation in its early stage, and of active hyperæmia of the brain. Unilateral impairment of hearing is sometimes an effect of cerebral hemorrhage, generally, however, the degree is slight, and complete deafness is rare. The hearing may be impaired or lost in meningitis and tumors of the brain. As an isolated symptom, however, deafness, complete or incomplete, has but little diagnostic significance. It derives its import wholly from its association with other symptomatic phenomena.

The various kinds of tinnitus aurium, or "noises in the ears," are of frequent occurrence in different cerebral affections, their presence having little or no weight in the differential diagnosis. They are common in anæmic patients, indicating no cerebral affection, except, perhaps, disturbance of the intracranial circulation. They occur in persons who have overstrained the mental faculties. They not only occasion annoyance, but they are apt to give rise to apprehensions of apoplexy or paralysis, of which they are never, taken alone, to be regarded as premonitory. Tinnitus, together with vertigo and other symptoms, is attributed to an affection of the semicircular canals of the labyrinth of the ear, in the affection known as Ménière's disease, which will be noticed when vertigo is considered among the functional disorders of the nervous system. Several remedies give rise to tinnitus. This effect of quinia is well known. The excessive use of strong coffee will induce it. Whenever this symptom exists without obvious causation, the external meatus auditorius should be examined with reference to an accumulation of cerumen. It is often due to this cause.

Olfaction.

The sense of smell is sometimes morbidly increased (hyperæsthesia). It may become perverted (paræsthesia), so that agreeable odors become disagreeable, and *vice versa*. These forms of disorder are occasionally observed in cases of hysteria, in the insane, and in connection with various cerebral affections. A morbid olfactory sensation has been observed to be premonitory of an epileptic seizure. Diminution and loss of the sense of smell (anosmia) are the most frequent forms of disorder. Irrespective of local causes, such as obstruction of the nostrils from constriction, nasal polypi, and coryza, they may be due to the dryness of the Schneiderian membrane as an effect of paralysis of the fifth or trigeminus nerve. In cases of paralysis of the facial nerve, also, dryness of the membrane, a result of the lachrymal secretion overflowing instead of passing into the nasal cavity, may occasion more or less impairment of this sense. The olfactory nerves may lose the power of conduction from fracture or disease of the frontal and ethmoid bones. These nerves are liable to atrophy, especially in the aged. The nerve may be impaired or lost in connection with meningitis, and tumors situated in the anterior lobes of the brain. The sense is sometimes wanting as a congenital defect. Anosmia of the left nasal cavity has been observed in cases of right hemiplegia with aphasia. Anæsthesia, as well as hyperæsthesia and paræsthesia, of olfaction, occurs in connection with hysteria and in the insane.

Gustation.

Hyperæsthesia and paræsthesia of the gustatory, as of the olfactory, nerve, are among the numerous symptoms of hysteria. They occur, however, when other evidence of hysteria is wanting, and when there is no well-defined disease of the nervous system, irrespective of these symptoms. Like the analogous disorders of olfaction (with which they are likely to be associated) they occur in the insane. Impairment or loss of this sense (anæsthesia gustatoria), complete or incomplete, may be attributable to local causes, such as coating of the tongue, or great dryness, and these are incident to various diseases. Aside from these local causes, the anorexia and loathing of food which occur in various pathological connections, involve an absence of the normal gustatory sensations.

Paralysis of the glosso-pharyngeal nerve abolishes the sense of taste at the root of the tongue on one side, together with the palate and pharynx. The gustatory sense at the apex and anterior half of the tongue is abolished in some cases of paralysis of the facial and the fifth nerve. The effect of paralysis of these nerves on the sense of taste is attributable to their anatomical relations with the chorda tympani. Intra-cranial lesions which are inhibitory as regards the transmission of sensations by the fifth nerve on one side, may cause anæsthesia of gustation on the same side. Bilateral paralysis of the fifth nerve may abolish taste on both sides of the anterior portion of the tongue. Unilateral loss of the sense of taste may be caused by diseases of the middle ear, or caries of the temporal bone which involve the chorda tympani. Paralysis of the facial nerve, caused by lesions within or below the Fallopian canal, involve unilateral loss of taste. The relations of the chorda tympani to the facial nerve furnish the explanation of these facts. With reference to the seat of lesions in cases of paralysis of the fifth and the facial nerve, the loss or abolition of taste in the anterior portion of the tongue, is of interest and importance.

The symptoms relating to taste being subjective, they can be known only through the statements of patients. The impairment or loss of taste in the posterior portion of the tongue and fauces might not be discovered by the patient, and it may be overlooked if confined to one-half of the anterior portion of the tongue. The latter is to be ascertained by causing the tongue to be protruded, and, the eyes of the patient being closed, applying a sapid substance alternately to each lateral half of the organ. A solution of either quinia or of common salt may be used in testing the sensation. Galvanism has been employed, but the foregoing simpler method is sufficient.

SYMPTOMS RELATING TO THE MENTAL FACULTIES.

Disturbances of the mental faculties or intellection are embraced in the symptomatology of various nervous and other diseases. There are also morbid affections of the mind, which, not being referable, in the existing state of pathological knowledge, to morbid conditions of the brain or other organs, at least during life, are recognized as mental diseases. These constitute a distinct class of nervous diseases, and, as such, they will be considered in this work separately. The mental disturbances which are symptomatic of general diseases, and of local affections not of the nervous system, are referred to in other sections. Those symptoms only are to be here considered which are involved in the diagnosis of the different diseases of that portion of the nervous system immediately concerned in the exercise of the mental faculties, namely, the brain. The disturbances which are symptomatic of cerebral, as distinguished, nosologically, from mental, diseases, may be classified as follows: coma, somnolency, delirium, feebleness of mind, and aphasia.

Coma.

This term denotes a state of unconsciousness from which the patient either cannot be roused, or is roused with great difficulty. The coma is complete or profound when the patient cannot be roused. The terms carus and lethargia express this extreme of the comatose state. The coma is incomplete when the patient is roused with more or less difficulty. The phrase semi-coma is often used to express incompleteness of the comatose state.

Coma is a symptom occurring in many of the affections of the brain, namely, the different varieties of meningitis, cerebral and meningeal hemorrhage, dropsical effusion, abscess, arterial embolism, and thrombosis. It may be remarked that in all these different affections, the immediate pathological causation is probably an interruption of a proper supply of oxygenated blood to the capillaries, dependent on either compression of the brain substance, or obstruction of the supplying arteries. Coma is also an element in certain functional affections of the nervous system. It occurs in epilepsy, hysteria, and catalepsy. In determining that it is symptomatic of some one of the cerebral diseases, other affections and certain toxical agencies are to be excluded. Thus, it occurs in uræmia, the essential fevers, cholesteræmia; and it may be due to narcotism and alcoholic intoxication. The differential points in the discrimination of the different cerebral diseases, and in the exclusion of affections other than those of the nervous system, will be considered hereafter.

Somnolency.

Somnolency, or sopor, as a symptom of disease, is a morbid disposition to sleep, the patient being aroused with little or no difficulty. A morbid somnolency is not followed by the refreshing effect of healthful sleep. The somnolent state not infrequently precedes coma. The causative conditions in both are similar, the difference being quantitative; and, in the main, the statements made in regard to coma will apply to somnolency.

An undue disposition to sleep may be a morbid condition unaccompanied by any other symptom of disorder. The author recalls two cases in which patients complained of inability to prevent falling asleep unless the mind was occupied in a way to engage strongly the attention. In both cases the health otherwise was apparently perfect. The mental faculties, in each case, were of a high order. The two sexes were represented by these cases. The complaint was the occasion of much annoyance. Sleep was unavoidable when the mind was not in active exercise, as in the interludes of conversation, at the whist table, one of the party deliberating before playing, in attempting to read, etc. In one of the cases a variety of remedies had been tried without any good result.

Delirium.

It is not easy to give an exact definition of delirium, and, practically, this is not necessary. The character of delirium varies in different diseases, and also in different cases of the same disease, the variations corresponding to certain of the varieties of insanity. A marked distinction is expressed by the terms active or maniacal, and passive or tranquil delirium. In active delirium the actions are directed by certain delirious or emotional impulses. There may be violence or attempts to do injury, and mechanical restraint may be required. This kind of delirium sometimes occurs in the first stage of acute meningitis, and in active hyperæmia, especially if the latter be conjoined with alcoholic excitation (delirium ebriosum). Certain of the delusions belonging to delirium tremens lead to violence, more frequently, however, to active efforts to escape from imaginary dangers. In passive delirium the patient acts and talks under the influence of delusions which do not incite to violence. They are sometimes of a painful character, and sometimes the reverse. The idea of the acquisition of great wealth or distinction (*délire de grandeurs*) is characteristic of the affection known as progressive general paralysis. The delirium may be hilarious. It is sometimes erotic. What is commonly known as a low muttering delirium is characterized by incoherency, showing a succession of transitory delusions devoid of any rational connection. This variety occurs oftener in other diseases than those affecting the brain primarily, namely, in typhus and typhoid fever, and in the so-called typhoid condition which is incident to different general and local affections. The visual and aural hallucinations in delirium tremens are almost pathognomonic of this functional affection.

Feebleness of Mind.

Under this head may be embraced the different degrees and forms of weakness, without perversion, of the mental faculties. The mental faculties are more or less weakened, as a rule, in acute and chronic affections wherever situated, but a notable degree of weakness in intracranial diseases is explained by the fact that, in a physiological point of view, the acts of the mind are to be regarded as functions of the brain. As a general statement, then, diseases of the brain or its meninges affect much more than other diseases the mental powers. To this statement it is to be added that symptoms denoting feebleness characterize certain affections, and are sometimes of considerable importance as pointing to the existence of cerebral disease. In cases of hemiplegia from cerebral hemorrhage, emotional weakness is shown by the readiness with which the patient is led to weep or to laugh, when, perhaps, the intellectual faculties appear but little, if at all, impaired. Weakness as shown by the incongruity of these emotional manifestations, is, also, highly diagnostic of hysteria. In that affection there is notable diminution or complete loss of the power of the will to hold feelings in restraint, and to regulate the processes of thought or reasoning. In affections which involve lesions, namely, chronic meningitis, softening, abscess, and tumors, of the brain, all the mental faculties may deteriorate to a greater or less extent. The ability to concentrate the attention is diminished, the capability of reflection is abridged, the memory becomes defective, the judgment is impaired, and the moral sentiments are sometimes blunted. There may be an entire change in the mental character of the patient. An extreme degree of this deterioration of the faculties of the mind is imbecility. These symptomatic effects in some cases are sufficient to establish the existence of cerebral disease, taken in connection with other symptoms, when the latter alone are inadequate. Our present knowledge of the special connection of the different mental faculties with particular portions of the brain does not warrant the localization, in the latter, of diseases which affect, either exclusively or predominantly, certain faculties. The symptom which is next to be considered (aphasia) is perhaps an exception to this statement.

Aphasia.

This term, in its broadest etymological sense, should include mutism from any cause. Conventionally the term is restricted to cases of inability to speak, either because the patient cannot recall words to express the ideas which are in the mind, or because the power of giving to the words articulate expression is wanting. In this restricted sense the faculty of forming ideas, or ideation, remains, and is not necessarily impaired; that is, aside from the use of language, the intellect may continue intact. Imbecility is thus excluded. The patient knows what he would like to express in words, but either he is unable to recollect the words or he cannot perform the acts of verbal expression. The mutism does not depend on paralysis of the muscles of articulation. Inability to speak in consequence of any difficulty connected with the vocal organs, is excluded. In using the term aphasia, it is assumed that there is nothing abnormal in the parts involved in the acts of speaking. The affection is purely mental. Aphasia and aphonia are in no wise synonymous terms. Aphonia is the loss of voice from morbid conditions which relate to the organs of phonation; in aphasia, the volitional agency which causes phonation is affected. The distinction is concisely indicated by saying that aphasia is the loss of speech, and aphonia the loss of voice.

There are two varieties of aphasia, which are obviously distinct. In one variety the memory of words is preserved. The patient knows the language with which to express ideas, but the articulated expression is impossible. The muscles involved in articulation are not withdrawn from the influence of the will, but the power of co-ordinating their movements with reference to speech is lost. This variety of aphasia is appropriately distinguished as ataxic. The interference, quoting from Kussmaul, is, not with diction, but with articulation. It is evidence of this variety of aphasia that the ability to write or to express ideas by signs remains, although speech is lost. Moreover, patients affected with purely ataxic aphasia can read without difficulty. In some instances, however, the ataxia extends to the co-ordination of the movements involved in writing (*agraphia*); but generally in these instances, and in cases in which the ability to express ideas by signs or gestures is wanting, the aphasia is not purely ataxic.

In the other variety the memory of words is lost. The difficulty extends beyond the faculty of co-ordinating muscular movements for articulate expression; it extends to the ability of recollecting the language expressive of the ideas which exist in the patient's mind. The aphasia involves both diction and articulation. This variety is distinguished as amnesic aphasia. If the amnesia be complete, the processes of thought must be carried on without the aid of words, and it can hardly be otherwise than that ideation and intellection are more or less affected. In this variety the ability to express ideas by writing is necessarily lost. The amnesic and the ataxic variety may be combined, or each may exist without the other. The ataxic exists without the amnesic when the patient can use words in writing, and the amnesic exists without the ataxic, when, as is often the case, the patient is able to repeat dictated words. Both varieties coexist when the patient can neither speak, write, nor repeat words from dictation. Under these circumstances, language pronounced or addressed to the eye is understood; if not, the aphasia involves imbecility. It is not easy to determine to what extent the mental faculties, other than those relating to speech, are affected in cases of aphasia. The concomitant affections and evidences, not connected with language, of either the integrity or the impairment of intellect, must be the guides in forming an opinion of the mental capacity in particular cases. Ataxic aphasia is not incompatible with undiminished intellectual ability. Amnesic aphasia must lead to, if it be not from the first associated with, defective mental capacity.

Aphasia in either of the two varieties may be complete or incomplete. Most aphasic patients are able to utter a few words, or perhaps only a single word; and they utter the word or words at their command in answer to any question, notwithstanding the incongruousness which may be as apparent to themselves as to others. Both varieties are morbid exaggerations of difficulties which are common without being sufficient to be considered as pathological. Ataxic aphasia is an exaggeration of the temporary inability to give utterance to ideas under intense mental emotions. Amnesic aphasia exists, within physiological limits, when persons find themselves unable to recollect the names of persons or things with which they are familiar. The latter difficulty becomes often great with advancing years, and it is a consolatory fact that it may exist in a marked degree without any diminution of the reasoning powers.

A form of amnesic aphasia is an inability to express ideas by the appropriate words (paraphasia). Patients sometimes use language which is absurdly incongruous, not from confusion of ideas, but because the proper words are not recollected, and a haphazard selection is made. In a case under the author's observation, inquiry was made of the patient as to his age. He gave a number between two and three hundred years, adding, "I know this answer is not correct, but I cannot give the proper number." The symptoms in this case denoted cerebral disorder, without delirium, from which the patient recovered completely.

Aphasia has a definite significance as regards the localization of the lesion, or the morbid condition on which it depends. In the vast majority of cases the third convolution of the anterior lobe of the left hemisphere of the brain is the seat of disease. Of the small number of cases in which the symptom has been reported as existing without any affection seated in or near this part, it is probable that in some true aphasia did not exist, and in others anatomical changes were present which were overlooked. A few cases have been reported in which the corresponding portion of the right hemisphere was the seat of disease, and in these cases the persons were left-handed. From these facts the inference has been drawn that the third convolution, including the island of Reil, is specially connected with speech, and that the exercise of the functions therewith connected, in most persons, is limited to the left hemisphere, the exceptional instances being in persons who are left- instead of right-handed. Assuming the correctness of this view, we have here an example of an important physiological truth established by clinical observations.

In the majority of cases, aphasia occurs in connection with hemiplegia affecting the right side. The different affections giving rise to hemiplegia, namely, cerebral hemorrhage, embolism or thrombosis of the middle cerebral artery, tumors and abscess, are alike liable to the occurrence of this symptom. It occurs, however, without paralysis, and even without any other symptom pointing to cerebral disease. An instance of the latter has been reported by the author.[1] The significance in such instances is a localization of the affection limited exclusively to that portion of the brain, the functions of which relate to language. If, as in the reported case just referred to, the aphasia be temporary, it probably signifies obstruction by either thrombosis or embolism, of a small branch of the middle cerebral artery.

---

[1] Principles and Practice of Medicine, 4th ed., page 616.

The recovery of speech depends, in a great measure, on the nature and extent of the cerebral affection of which the aphasia is a symptom. When incidental to hemiplegia from which recovery takes place, the aphasia may, or may not, disappear. Accepting the doctrine of the duality of the cerebral organs of language, if the causative lesions in the left hemisphere remain, the restoration of speech will depend on the development of functional activity in the corresponding organs of the right hemisphere; and, if the latter from non-use are incapable of the exercise of their functions, there is no prospect of recovery in this direction. Aphasia being a symptom only, the indications for treatment relate mainly to the cerebral affection with which it has a symptomatic connection. It is, however, an important object, by means of systematic efforts, on the part of the patient, to regain the power of speech.

SYMPTOMS RELATING TO MUSCULAR MOVEMENTS.

The symptomatology of the nervous system under this division embraces diminution or loss of power over voluntary muscles, or motor paralysis; impairment of the ability to co-ordinate muscular action, or ataxia; convulsions or spasms, cramps, contractures, tremor, and reflex movements.

Motor Paralysis. Akinesis.

Diminution, or loss of the power of the will over voluntary muscles, is a result of disease or injury of the brain at the situations where the primary acts of the will take place; or of nerves which are conductors of volitional influence at any point between their cerebral origin and the muscles to which they are distributed; or, lastly, of the muscles themselves. Paralysis arising from causes affecting either the brain or the nerves of volition is distinguished as neuropathic; arising from causes affecting directly the muscular organs it is called myopathic. Paralysis is complete when muscles are totally withdrawn from the power of the will; it is incomplete when there is not entire loss, but more or less diminution, of voluntary power. The term paresis is used frequently by recent writers to designate incomplete paralysis. To denote the extent of the paralysis, that is, the number of muscles paralyzed, the terms general, partial, and local are employed. General paralysis exists when the muscles of the four members are paralyzed, with or without paralysis of muscles to which cranial motor nerves are distributed. Paralysis is partial when a considerable portion of the body is affected. Examples of partial paralysis are paraplegia and hemiplegia. A local paralysis is limited to a few muscles, perhaps only a single muscle. The loss of power over muscles of the eye or of the face exemplifies a local paralysis.

There is seldom any difficulty in determining the existence of motor paralysis. In most cases it is obvious to both physician and patient. It may be overlooked in children for want of due examination. In a state of unconsciousness, or during an attack of apoplexy, attention is requisite to discover it. The points to which observation is to be directed will be mentioned in connection with the different forms of paralysis.

The differentiation of general, partial, and local paralysis need not be here considered.

Having ascertained the existence of paralysis, together with its degree and extent, the seat of the causative affection is to be ascertained. The affection may be seated in the brain, the spinal cord, or in the course of motor nerves between the points where they originate and the muscles in which they terminate. A paralysis dependent on an affection of the nerves is distinguished as peripheral, the periphery of the nervous system comprising their whole course from their centric connections to their terminations. With reference to seat, therefore, neuropathic paralyses are either cerebral, spinal, or peripheral.

A cerebral affection is always to be inferred from the existence of paralysis of the upper and the lower limb on one side (hemiplegia). The instances are so few as to render it always vastly improbable that an affection of the upper portion of the spinal cord is so localized as to cause paralysis thus limited. The cause is certainly seated in the brain, if, with the hemiplegia, the muscles of the face or tongue be paralyzed. It is as improbable that a paralysis limited to the two lower limbs (paraplegia) is cerebral, as that hemiplegia is spinal. A general paralysis is rarely of cerebral origin. It may be due to hemiplegia, from meningeal or cerebral hemorrhage and tumors, occurring first on one and afterwards on the other side; or a hemorrhage may take place simultaneously upon or within both hemispheres of the brain, and paralyze at once the four limbs. In the disease known as progressive general paralysis (dementia paralytica), the four limbs may become incompletely paralyzed or paretic. Whenever general paralysis is caused by intracranial lesions, it is associated with cerebral symptoms, by means of which it may be differentiated from general paralysis of spinal origin; and, in most instances, the cerebral source is further shown by paralysis of the face or tongue. Exclusive of the cranial motor nerves, a local paralysis is rarely cerebral. Paralysis of the orbital or the facial muscles, or of the tongue, may be either cerebral or peripheral. The differential diagnosis is made by excluding discoverable causes acting upon the nerves, and by taking cognizance of coexisting symptoms which denote disease of the brain. If two or more cranial nerves which are proximate within the skull, and divergent afterwards, be affected, a cerebral affection is probable.

Cerebral paralysis is infrequently associated with anæsthesia or sensory paralysis. Muscular movements which are independent of the will, namely, those distinguished as reflex and convulsive or spasmodic, are readily produced in the paralyzed muscles. Movements showing electrical excitability are not lessened but often increased if the paralysis be of centric origin. Atrophy of the paralyzed muscles ensues slowly if the paralysis be cerebral. These are points of contrast with spinal and peripheral paralyses.

As already stated, hemiplegia from spinal disease occurs, but the instances are few. A unilateral affection of the spinal cord may give rise to motor paralysis on the affected side, together with sensory paralysis on the opposite side. Affections of the cord giving rise to paralysis are usually bilateral, and, if localized in the upper portion of the cord, or extending from below to this portion, the paralysis is general. A general spinal paralysis is unattended by symptoms which denote central disease, and the paralysis does not involve the facial muscles nor the tongue. The orbital muscles are sometimes involved, and myosis is not uncommon. The most frequent form of spinal paralysis is paraplegia. Paraplegia always implies disease or injury of the dorsal or the lumbar portion of the spinal cord. Anæsthesia may or may not be associated; it accompanies much oftener spinal than central paralysis. The transmission of sensations is often retarded. Incontinence and retention of urine are not infrequent, and these symptoms are rare in cases of cerebral paralysis. Priapism, seminal emissions, and impotency are not uncommon in cases of spinal paralysis. The electrical excitability of the paralyzed muscles is often, but not invariably, either weakened or wanting. Reflex movements may be either increased, diminished, or lost. Atrophy of the muscles which are paralyzed is more constant and rapid than in cases of cerebral paralysis. In cases of paraplegia, a sense of constriction, as if a girdle tightly encircled the body, is a frequent symptom.

A peripheral paralysis is usually local, being limited to muscles under the influence of a single nerve or of only a few nerves. As a rule, anæsthesia is associated with motor paralysis, having limits corresponding to those of the latter. Reflex movements cannot be excited in the paralyzed muscles. These muscles do not participate in spasmodic or convulsive movements caused by affections of the brain or spinal cord. Voluntary power, however, is retained over muscles receiving branches of the nerve or nerves affected, between the local lesion and the brain or spinal cord. The electrical current, applied to the nerve or nerves posterior to the situation of the lesion, fails to excite the paralyzed muscles; but they may be excited by the current applied anterior to the lesion, that is, between the lesion and the muscles which are paralyzed. The paralyzed muscles quickly become atrophied, and in a notable degree. Symptoms indicative of cerebral or spinal disease are wanting.

The lesions or morbid conditions of which paralysis—cerebral, spinal, or peripheral—is symptomatic are various, namely—aside from those which are traumatic—hemorrhage in different situations, thrombosis, embolism, abscess, tumors, sclerosis, etc. The differentiation of these enters into the diagnosis of particular paralytic affections, and will be considered in that connection. Certain paralytic affections, as will be seen hereafter, are dependent on conditions at present not well understood. Hysterical, diphtheritic, and the so-called reflex varieties of paralysis belong in this category. These are distinguished as functional.

Myopathic is distinguished from neuropathic paralysis by the loss of power being due to morbid changes in the muscles. It is a question whether this should be regarded as a form of paralysis. If it be so considered, the disease known as progressive muscular atrophy is a notable example. It is convenient to include that disease among the paralytic affections, and also the affection known as pseudo-hypertrophic paralysis.

Treatment of Motor Paralysis.

Paralysis is a symptom occurring in numerous affections, centric and peripheral, of the nervous system. The treatment of the various paralytical affections will vary according to their nature and situation. These affections will form one of the several groups into which nervous diseases are to be distributed. There are, however, certain therapeutical objects which relate to paralysis irrespective of its pathological connections. These objects are, first, the maintenance of nutrition in the nerves and muscles involved in the paralytic affection—in other words, the prevention of atrophy, and degeneration of structure; second, the preservation or the restoration of the functional capacity of the paralyzed parts. The measures for effecting these objects are friction and shampooing, passive movements, electrization, volitional exercise, and the administration of strychnia or nux vomica. In conjunction with these measures, the improvement of the general health by appropriate medicinal and hygienic means, is often an important object in the treatment. Rubbing the paralyzed parts, employing superficial and deep pressure, localized electrization, with mild continuous or galvanic currents, and movements of the parts without the will of the patient, increase the nutritive processes. Excitation of the muscular contractility by the interrupted or faradic current, tends to develop the functional capacity of the muscles when they do not respond to the will. If the paralysis be not complete, that is, when the muscles respond in any measure to the will, voluntary muscular exercise is pre-eminently important as a means of restoration. Recovery, or as close an approximation thereto as is possible, often depends on the judicious and persevering employment of volition in conjunction with electricity. The desirable ends of treatment, as regards the measures addressed directly to the paralysis, are a healthy nutrition of the paralyzed organs, and the capability of resuming their functions whenever the causative conditions of the paralysis cease to be operative. Clinical experience has established the utility, in certain forms of paralysis, of the nux vomica or strychnia as conducive to these ends.

Ataxia.

The term ataxia is now used to express a lack of the power of co-ordinating muscular movements in voluntary acts. This is the chief morbid condition in the disease called locomotor ataxia; called also, sometimes, Duchenne's disease, after the name of the observer who was the first clearly to establish its character as distinct from paralysis. Other names are tabes dorsalis, and myelo-phthisis. The ability to walk, or even stand, to carry food with the hand to the mouth, and to perform other acts requiring combined muscular movements, may be lost, although the power of the will to cause muscular movements is in no wise diminished. Ataxia and paralysis are therefore symptoms entirely distinct from each other, although they are not infrequently associated. They relate to separate functions of the nervous system involved in voluntary acts, namely, the capability of producing, and of co-ordinating, muscular movements by the will. In paralysis, the power of the will, as denoted by the force or strength of muscular action, is diminished or lost; in ataxia, the faculty of co-ordination is more or less impaired, the latter occurring either with or without diminution of voluntary muscular power.

Locomotor ataxia is symptomatic of a special lesion of a portion of the spinal cord, namely, sclerosis of the latero-posterior columns. It will be considered with reference to diagnosis and treatment, as one of the individual spinal affections.

Convulsions and Spasms.

The terms convulsions and spasms, in their most comprehensive sense, embrace all involuntary contractions of voluntary muscles. There are, however, certain varieties which require distinct notice, namely, cramp, contracture, tremor, and reflex movements. The convulsive or spasmodic muscular contractions to be considered under the above heading, are exclusive of the varieties just named.

The terms convulsions and spasms are often employed as synonymous. The former is commonly applied to involuntary movements which are general, or extending over a large part of the muscular system; which have a certain degree of violence, and the occurrence of which is paroxysmal. A convulsion, in common parlance, implies these characters. On the other hand, movements denominated spasmodic are more limited, less forcible, and perhaps of longer duration. The term spasm is applied to contraction of involuntary muscles, whereas it is not usual to use the term convulsion in this sense. In many of their applications the two terms are convertible.

Convulsive or spasmodic movements are either tonic or clonic. These names express a well-marked distinction. The contractions are tonic when they continue, with more or less intensity, for a considerable length of time. They are clonic when they alternate, in rapid succession, with relaxations of the affected muscles. Tonic contractions keep the parts to which the muscles are connected in a rigid state, it may be for hours or even days; by clonic contractions the parts are in active and more or less violent motion while the convulsions or spasms last. Tonic contractions are notably exemplified in tetanus; hence, occurring in other connections, they are sometimes called tetanic. Clonic contractions constitute a marked feature of an epileptic paroxysm, and analogous contractions in other affections than epilepsy are said to be epileptiform. The term eclampsia is used to denote epileptiform convulsions, especially when occurring in children, and in the puerperal state. Epileptiform convulsions have been already referred to as constituting a grave manifestation of uræmia. They are among the pathological effects of alcoholism. In the two latter connections they are of toxical origin. A toxical agent, causing tonic or tetanic convulsions, is strychnia in poisonous doses.

Convulsive movements may be limited to one side, that is, unilateral. They are then symptomatic of disease of one hemisphere of the brain. Limited to the lower limbs, they are diagnostic of disease of the spinal cord not extending above the lumbar portion.

Spasmodic movements still more limited may be distinguished as local. Twitching of a few of the muscles of the face, or perhaps a single muscle, affords an illustration of localized spasm, not of serious import, but extremely annoying. Affecting a greater number of the muscles of the face, and generally unilateral, facial spasm is a remarkable feature of the affection long known as *tic-douloureux*. The face on one side presents a series of grimaces, which falsely represent facial expressions of varied mental emotions, whence they are called mimetic spasms. The author has met with an instance of spasmodic movements limited to the tongue, analogous to the nictitation which is pathognomonic of hysteria. The different forms of localized spasm will be noticed in connection with the particular spasmodic affections of the nervous system. Spasm of the glottis and spasm of the diaphragm have already been considered in connection with the diseases of the respiratory system.

The late researches of Fritsch, Hitzig, Ferrier, Nothnagel, and others, which appear to show that circumscribed portions of the brain have special relations, as motor centres, to the movements of particular parts of the body, may lead to the localization of spasmodic or convulsive affections to a much larger extent than is practicable with our present knowledge. An accumulation of pathological and clinical facts confirmatory of the results of experimental physiology, is essential before these results can be admitted as elements in diagnosis.

Muscular movements resembling those in convulsions or spasms, occurring in hysteria, are characteristic from the fact that they are not purely involuntary or automatic. They are produced by the will acting in an aimless, irregular, and a more or less violent manner. True convulsive or spasmodic movements, however, may be hysterical. Spasm of the muscles of the forearm are common. Forcible closure of the jaws (trismus) is an occasional form of local spasm in cases of hysteria. General tonic and clonic contractions are sometimes observed.

Convulsions are sometimes feigned by prisoners to obtain a pardon or relaxation of discipline; by soldiers in order to be received into hospital or discharged from service; by mendicants to procure alms; and by women to enlist interest or sympathy. The author has met with an instance of this kind of malingering in a man in the higher walks of life, the object apparently being to excite alarm or pity in the mind of his wife. The diagnosis was confirmed in this case by the immediate cessation of the pseudo-convulsive movements when, seizing an opportunity of being alone with the patient, he was told, although he feigned unconsciousness, that his efforts at deception were fully understood, and by the fact that this method of arresting the convulsions terminated all professional relations. After some clinical experience, the distinction between volitional and automatic convulsive movements is made without difficulty; and, moreover, the concomitant circumstances show the absence of the diseases of which convulsions are symptomatic.

The remarkable condition of the muscular system in catalepsy is a peculiar variety of tonic spasm. The trunk and limbs remain for a considerable period in any position in which they may be placed. This variety of spasm is pathognomonic of that disease.

The clinical recognition of convulsions and spasms is easy. The difficulty of diagnosis relates to their significance or pathological relations in individual cases. Are they symptomatic of meningitis—cerebral or spinal—of tumor of the brain, of epilepsy or hysteria, of uræmia or other toxæmic conditions, of reflex irritation within the alimentary canal or elsewhere, etc.? these are questions to be answered after an investigation of the history, symptoms, and circumstances in individual cases, and they will be considered in connection with the diagnosis of different diseases of the nervous system.

Cramps.

The term cramps signifies a variety of tonic local spasm. The spasmodic contraction is limited to a single muscle or to a small group of muscles. It is exceedingly painful. It continues usually for a few moments or seconds, recurring frequently after brief intervals. Almost every one is practically familiar with cramps affecting the muscles of the leg or foot, and especially the gastrocnemius. They are apt to occur in these situations after fatigue from walking, in pregnancy, during labor, and especially in the night. Here and in other situations they constitute a prominent symptom in epidemic cholera, which, from this fact, has been called spasmodic cholera. Cramps affecting the abdominal muscles sometimes occur in cases of intestinal colic. The spasmodic affection which results from the long-continued use of the muscles of the fingers and forearm in writing is commonly known as the writer's cramp. Cramps of the gastrocnemius muscles have been observed in connection with diabetes mellitus. The author has met with a case of that disease in which frequently recurring cramps of the muscles of the arm constituted a prominent symptom. They occur oftener as an intercurrent disorder in various pathological connections, than as a symptom of diseases nosologically classed among those of the nervous system.

Contracture.

A contracture is a persistent shortening of muscles from contraction. It may be either a cause or a consequence of deformity of the limbs or trunk. Paralysis of certain muscles leads to a persistent contraction of other muscles which are the antagonists of those paralyzed (paralytic contractures). The shortened muscles, after a time, become rigid from sclerotic changes, and the contracture is then permanent. The contraction may be due to anatomical changes in the contracted muscles (myopathic contractures). Diseases of the joints, bones, or ligaments, which occasion deformity, involve the persistent shortening of muscles, and the state of contraction induces changes which render them rigid and inextensible. Protracted or frequently recurring tonic spasm from neuritis, injuries of nerves, the presence of a foreign body, or the irritation of a tumor, may eventuate in permanent contraction (neuropathic contractures). Contractures may result from tonic spasm induced by reflex irritation and by a centric influence derived from the brain or spinal cord. In cases of hemiplegia, the forearm and fingers not infrequently are flexed from a cerebral influence, and the parts, at first easily extended by a little manual force, eventually become rigidly fixed.

Contractures are easily ascertained. The questions, as regards diagnosis, relate to the different varieties, namely, paralytic, myopathic, and neuropathic. The treatment embraces tenotomy, mechanical appliances to remedy deformities, and the employment of electricity. The subject belongs to orthopædic surgery.

Tremor.

The term tremor or trembling is sufficiently explicit as regards the distinctive character of this variety of abnormal muscular movements. The rigor which often accompanies the cold stage of a paroxysm of intermittent fever is a notable illustration. In certain pathological connections the oscillatory muscular movements observe a rhythmical order.

Tremor is a prominent symptom in two important diseases, namely, disseminated cerebro-spinal sclerosis and the affection commonly known as paralysis agitans. In the former of these affections the tremor is preceded by incomplete general paralysis or paresis; in the latter the paretic condition is subsequent to the tremor. In sclerosis, the tremor occurs from the stimulus of volition; in paralysis agitans, it is independent of acts of the will. In both affections, the tremor, certainly in the great majority of cases, is irremediable.

With the tremor incident to old age (*tremor senilis*) every one is familiar. In these cases it is not amenable to treatment. It occurs also sometimes in middle age, and even in youth, when not connected with other symptoms denoting disease of the brain or spinal cord, and when the etiology is not apparent. It is there distinguished as *tremor essentialis vel simplex*.

Tremor is a symptom in some cases of incomplete hemiplegia and paraplegia, occurring in the paralyzed muscles. It is an effect of different toxical agents, namely, alcoholism (tremor potatorum), the abuse of opium, nicotinism, the excessive use of coffee and tea, mercurial poisoning (tremor mercurialis), and occasionally in connection with lead poisoning.

Allied to tremor and to clonic spasms are the movements which occur in chorea. This affection is characterized by jerking movements of the limbs, and facial muscles, extending sometimes to the head and trunk, excited by volitional acts, but occurring also irrespective of the will. The ability to co-ordinate voluntary movements is impaired or lost, and, hence, they involve ataxia.

The twitchings of muscles, especially those of the forearm, giving rise to subsultus tendinum, are also allied to tremor and spasms. Fibrillous twitchings in the muscles of the lower extremities are observed in progressive muscular atrophy, and in some cases of myelitis.

Reflex Movements.

Spasms or convulsions, cramps, and tremor may be caused by reflex influences; but reference under this heading is limited to the involuntary movements produced by peripheral excitation made with a view to diagnosis. The usual method of excitation is by irritating or tickling the surface, and especially the soles of the feet. The application is chiefly to cases of spinal paralysis. Abnormal reflex movements are excited in the early stage of spinal meningitis, and in some cases of myelitis. On the other hand, they are slight or wanting if the cord be subjected to much pressure from the presence of morbid products, or if it have undergone disorganizing changes. The increase and diminution or loss of reflex excitability thus afford important information in cases of general paralysis, paraplegia, and paralysis dependent on local morbid conditions. Symptoms derived from this source constitute diagnostic points involved in the differentiation of the different affections of which paralysis is an effect.

Westphal, Erb, and others have recently pointed out symptoms pertaining to the involuntary muscular movements caused by striking certain tendons. If the ligament above the patella be struck, while the leg hangs loosely, in a healthy person, a forcible jerking movement is produced; and the heel is raised if the tendo Achilles be struck. The names "reflex action of tendons," and "tendon reflex" have been applied to this manifestation. The terms "knee phenomenon," and "foot phenomenon" have also been used. Now, the reflex movements thus produced are often wanting in ataxia, whereas, in the affection called spasmodic tabes, and spastic spinal paralysis, these movements are morbidly increased. The absence of these movements is not invariable in cases of ataxia. This has been shown by cases which Dr. Allan McLane Hamilton has collected.[1]

---

[1] *Vide* Boston Medical and Surgical Journal, December 19, 1878.

THE DIAGNOSIS AND TREATMENT OF DISEASES OF THE NERVOUS SYSTEM.

THE arrangement into classes of nervous diseases will be after a plan which seems most convenient in a clinical point of view. ACUTE inflammatory affections within the cranium and spinal canal will be first considered. Afterward, different affections distributed in groups on the basis of a leading or distinguishing symptom common to the affections in each group, as follows: 1. Affections giving rise to coma. 2. Paralytic affections and locomotor ataxia. 3. Spasmodic or convulsive affections. 4. Neuralgic affections.

Certain functional affections (neuroses), not included in the foregoing groups, will claim separate consideration. Mental diseases will be considered separately.

I.

INTRA-CRANIAL AND INTRA-SPINAL ACUTE INFLAMMATORY DISEASES.

ACUTE SIMPLE CEREBRAL MENINGITIS. TUBERCULOUS MENINGITIS.

THE surfaces of the brain and spinal cord are so closely connected with their investing membranes, that the diseases of the latter are properly included among those of the nervous system. In fact, disease of the cerebral or spinal meninges can hardly exist without involving, more or less, the substance of the brain or cord. To the latter are referable the important symptoms of meningeal disease. The intra-cranial inflammatory diseases which will be here considered are acute simple cerebral meningitis, and granular or tuberculous meningitis. Chronic meningitis, inflammation of the dura mater (pachymeningitis), and circumscribed inflammation of the substance of the brain (cerebritis) will be considered in other groups, namely, the two first among the diseases which give rise to coma, and the last among the paralytic affections.

ACUTE SIMPLE CEREBRAL MENINGITIS.

Other names by which this affection is designated, are acute hydrocephalus and lepto-meningitis. The term hydrocephalus, as applied to an inflammatory affection, should be dropped. Its signification is that of a purely dropsical effusion. A simple acute meningitis may be limited either to the convexity or the base of the brain. Basilar meningitis and meningitis of the convexity need not be here considered separately; it will suffice to refer to certain symptoms which point to the localization of the inflammation in one or the other of these two situations. It is needless to consider the disease in childhood and infancy as a distinct variety, the diagnostic characters being essentially the same as in after periods of life. An important clinical question, however, in cases of the disease in children, is its discrimination from granular or tuberculous meningitis. This question is of less importance in cases of the disease in adults, from the fact that the latter affection is comparatively rare after the age of childhood. The infrequency of simple acute meningitis is to be taken into account in the diagnosis. As a rule, the rarer a disease, the stronger the evidence required to establish the diagnosis. In view of the infrequency of simple acute meningitis, and of the difficulty, in certain cases, of discriminating it from other affections, its etiological relations are of importance. The causes in the majority of cases are injuries of the skull, caries of cranial bones, and internal otitis with suppuration (oto-meningitis). It occurs in cases of insolation. Excessive indulgence in alcoholics may produce it. It is secondary to acute articular rheumatism, Bright's disease, pyæmia, syphilis, and to the essential fevers, both continued and eruptive, being, however, an exceedingly rare complication in all these diseases. Of the epidemic disease known as cerebro-spinal meningitis, or cerebro-spinal fever, it is, as the name implies, an essential element. The latter affection will be embraced in the class of general diseases.

The classical division of the course of the disease into a stage of excitement and a stage of oppression, is generally exemplified; at all events, the distinction, as regards symptoms, is clinically determinable. The succession of these symptoms is a diagnostic point. If a patient be first seen when the symptoms denote oppression of the brain functions, it is important for the diagnosis to ascertain that the symptoms preceding these denoted cerebral excitation. The local symptoms of the first stage are: intense cephalalgia, referred to both sides of the head, and diffused, with a sensation of tension; active congestion of the face; a sense of heat communicated to the hand; injection of the conjunctiva, with strong pulsation of the temporal arteries and the carotids; frequently active delirium, the patient sometimes furious under the influence of hallucinations and delusions; tonic convulsions in some cases, and contractures, especially of the flexor muscles of the arms or legs, which are overcome only by much force; opisthotonos, spasm of the muscles of the pharynx, strabismus and trismus; disturbances of sight and hearing; great susceptibility to light and sounds; contraction of the pupils; tremulousness of the tongue, and accelerated breathing not accounted for by any pulmonary affection. With more or less of these symptoms present, and in a degree more or less marked, the temperature and pulse show quickly high fever, the body-heat often rising to 104° or 105°, and persisting without notable remissions. Vomiting occurs early, and is usually a prominent symptom. The author has met with an instance in which, prior to the autopsy, from the prominence of this symptom, the patient was supposed to have died with acute gastritis.

In the cases characterized by active delirium, convulsions and contractures, it is a fair inference that the convexity of the brain is the seat of the meningeal inflammation. On the other hand, the symptoms which pertain to the cranial nerves, namely, strabismus, pharyngeal spasm, disturbances of the special senses, and accelerated breathing, point to basilar meningitis.

In infants the disease gives rise earlier and more constantly to convulsions than in adults. Vomiting is apt to be more prominent as a symptom. Hyperæsthesia of the surface is often marked. Rolling of the head from side to side is common. Spasm of the glottis is an occasional event. Constipation and a collapsed abdomen are constant.

The symptoms of oppression follow after a variable period which is sometimes short, perhaps not extending beyond twenty-four or thirty-six hours. The transition from the first to the second stage is rarely abrupt, and symptoms of excitation often are combined, and alternate with those of oppression. The latter symptoms are somnolency, coma, relaxation of contracted muscles, hemiplegia, dilatation of the pupils, loss of vision, disturbance of the rhythm of respiration, infrequency and irregularity of the pulse, and paralysis of the sphincters. The urine often contains albumen which is not proof of antecedent renal disease. The high temperature persists after the occurrence of the symptoms of oppression.

The diagnosis involves the exclusion of active cerebral hyperæmia. The symptoms of the early stage of acute cerebral meningitis may be simulated in cases apparently of mere hyperæmia. In cases which have fallen under the author's observation, furious delirium, intense cephalalgia, injection of the face and conjunctiva, etc., have occurred after the excessive use of alcoholics, conjoined with mental excitement. The pathological condition is, in fact, that of the first stage of inflammation ending by delitescence, that is, without inflammatory products.

In acute functional mania there is absence of fever, or of the considerable elevation of temperature which occurs in acute meningitis.

The delirium in the essential fevers is never, *per se*, evidence of inflammation, unless associated with other symptoms belonging to the clinical history of meningitis. This statement holds true, also, with respect to somnolency and coma. These symptoms are to be taken as evidence of meningeal inflammation only when they have been preceded by those of excitation, or, in other words, of the first stage of meningitis. By this rule are excluded numerous affections which involve somnolency and coma, namely, uræmia, pernicious intermittent fever, alcoholism, lead encepholopathy, etc.

The differentiation of simple and tuberculous meningitis in children is difficult, inasmuch as the symptoms in both do not differ essentially. The chief diagnostic points are the slow development of the latter, impaired health for some time prior to well-marked cerebral symptoms, and the evidence of coexisting pulmonary tuberculosis. The discrimination is desirable, since the prognosis is more unfavorable in tuberculous than in simple meningitis.

The ophthalmoscope may afford evidence either for or against the existence of simple meningitis. If the meningeal inflammation be basilar, there will probably be congestion at the fundus of the eye, and, perhaps, descending neuritis. These appearances are evidence of, although their absence does not exclude, meningitis. In doubtful cases, as when cerebral symptoms are developed in the course of the essential fevers, pyæmia, etc., the absence of the ophthalmoscopic evidence of meningitis is entitled to weight in the exclusion of the disease.

Treatment of Simple Acute Cerebral Meningitis.

In a small minority of cases the disease ends in recovery. This should be borne in mind in order that the fact of the disease generally proving fatal may not take away all encouragement. From the infrequency of the disease it must be long ere it will be possible to make a collection of cases sufficiently large for analytical study with reference to the relative fatality under different methods of treatment, and when no active therapeutical measures are employed. It follows that, at present, the treatment is to be governed by rational views and the practice of those whose judgment commands confidence.

The abstraction of blood is indicated in the first stage, provided the patient be not of feeble constitution; if the pulse denote systolic strength; if the cephalalgia be great; the face much flushed; the delirium active—in short, if the symptoms show a high grade of inflammation. In adults, venesection is the preferable mode; in children, leeches are to be preferred. The advantage of bloodletting over other methods of depletion, is chiefly in its promptness of action, taking into view the short duration of the first stage of the disease. The objects are palliation of symptoms, lessening the intensity of the inflammation, perhaps the limitation of inflammatory products, and, possibly, an abortion of the disease at the first stage. As regards the amount of blood abstracted, the practitioner is to be guided by the constitution of the patient, the severity of the disease, and the immediate effects of the measure. The danger of death from apnœa renders the danger of impairing the vital powers far less than if the fatal tendency were in the direction of asthenia. The bowels should be moved by an efficient cathartic; a purgative dose of calomel may be given, followed by the sulphate or citrate of magnesia. The hair should be cut close to the scalp, and cold applied either by the douche, the ice-cap, or napkins dipped in ice-water and renewed after intervals of a few minutes. Ether spray has been employed as a means of local refrigeration. The douche, followed by steadily-continued cold applications, is the most efficient mode; but the apprehension and excitement which it is likely to cause, render it unsuitable for children. It may be resorted to during convulsions. The lower extremities should be stimulated, at intervals, by mustard or salt foot-baths. The bromine salts are indicated from their effects in diminishing the force of the heart's action, lowering arterial tension, and lessening the quantity of blood within the cranium. The patient is to be withdrawn, as far as practicable, from the stimulus of light and sounds. The disease does not contraindicate the use of opium to allay active delirium or great restlessness and irritability. The continuance of this remedy and the doses are to be regulated by the effects. Even the inhalation of chloroform, or the administration of chloral, is advisable, if opiates fail to have the desired effect.

The foregoing measures fulfil the indications derived from the symptoms of excitation which characterize the first stage of the disease.

Attributing the symptoms of oppression to two conditions, namely, the pressure of inflammatory products and cerebral exhaustion, the rational objects of treatment are to promote the absorption of the former, and to sustain the vital powers. The remedies for the first of these objects are mercury and the iodide of potassium. With regard to the first of these remedies, the clinical question is, not whether its sorbefacient influence has been heretofore overrated, but whether it be of any value; nor are the so-called spoliative effects of the remedy and the inconveniences of a possible ptyalism to be balanced against its usefulness, however small, for the reason that we are dealing with a disease which involves very great danger to life. Small doses, after short intervals, are to be given, and these may be supplemented by mercurial inunction. The iodide of potassium has for many years been relied upon, in a great measure, in the medicinal treatment of this disease. Although it is questionable whether the remedy has much potency in promoting the absorption of the inflammatory products, so long as there is ground to suppose that it may have any power in that way, it should not be withheld. The doses should be carried to the extent of tolerance. A blister to the nucha—except, perhaps, in young children—may be recommended. Supporting measures, that is, nutriment and alcoholics, are indicated in proportion as the symptoms denote failure of the vital powers. If life be prolonged beyond the average duration of the disease, asthenia becomes an important element in the mode of dying.

In the majority of fatal cases, death takes place within a week. The duration is sometimes shorter, and in some cases it extends to two, three, or four weeks. When the disease does not end fatally, it often becomes chronic, or is followed by persistent pathological effects.

Tuberculous Meningitis.

In this variety of cerebral meningitis, the inflammation is secondary to the production of tubercles, or miliary granulations in the pia mater. These are limited to, or more abundant at, the base of the brain, and the meningitis is, therefore, as a rule, basilar (granular basilar meningitis). The inflammation rarely has the acuteness of acute simple meningitis; it is generally subacute. In the great majority of cases, the affection occurs in children between the age of two and of seven. Next in frequency its occurrence is between twenty and thirty years. The exceptions are extremely rare to the rule that a tuberculous affection coexists in other parts, namely, the lungs, liver, spleen, etc. After adult age, it is almost always, if not invariably, secondary to pneumonic phthisis. These are facts which are not to be lost sight of in the diagnosis.

A distinguishing feature is the occurrence of premonitory symptoms. These are rarely wanting. They are due to the production of tubercles in different situations, and in the cerebral meninges prior to the development of meningeal inflammation. Children, during the prodromic period, are irritable, and indisposed to childish sports; they are easily fatigued, the appetite is impaired, there is loss in weight, the sleep is disturbed, digestion is disordered. These symptoms are present usually for weeks, or sometimes for months before meningitis is declared. Occurring without any apparent cause, they should excite apprehension of danger; but they are not sufficiently characteristic to warrant a positive opinion that they denote tuberculosis. In adults, the symptoms and signs of pneumonic phthisis are explicit before the development of tuberculous meningitis.

The symptoms of excitation and depression (more properly oppression) precede each other, alternate, and are combined, as in cases of simple meningitis; the inflammation, however, being subacute, the symptoms characteristic of the first stage are less marked than in the latter affection. Cephalalgia and vomiting are prominent symptoms. The latter occurs independently of the taking of food or drink, mucus and bile being vomited if the stomach be free from ingesta. In children too young to describe subjective symptoms, the cephalalgia is shown by the hands being often carried to the head, and by a sudden shriek at intervals (hydrocephalic cry). The latter may continue after somnolence or semi-coma has taken place, and, associated with other symptoms, it is highly significant. There is notable hyperæsthesia of the sense of hearing and of vision. The eyelids are closed, and the head turned so as to avoid, as much as possible, any exposure to light. The face has a frowning expression, and is often alternately flushed and pale. The pupils are contracted, and oscillatory movements of the iris are sometimes observed when it is exposed suddenly to a bright light. The mental condition is one of extreme irritability; efforts to relieve and soothe the patient are repelled with anger. The bowels are constipated, and the abdomen depressed. The pulse and temperature denote fever, which, however, has not the same intensity as in cases of simple acute meningitis. Morning remissions are generally marked; sometimes so much as to lead to the supposition that the disease is remittent fever. Delirium and convulsions are rare. Frequent sighing is often a noticeable symptom. The ophthalmoscope shows congestion and œdema of the optic disk; and, in a certain proportion of cases, tubercles are seen in the choroid coat.

Following the foregoing symptoms, present in individual cases in a variable proportion and degree, are those proceeding from compression by inflammatory deposits, and from cerebral exhaustion. The patient becomes somnolent, uttering from time to time the short, as it were, automatic cry already referred to. The respirations are irregular in rhythm. The pulse, diminished in frequency and at first faltering, may become intermittent and irregular. The mind wanders, the delirium being tranquil. The muscles of the nucha, and sometimes those of the lumbar region, are the seat of contractures which may affect also the muscles of the limbs. Convulsions are not infrequent. Strabismus is frequent. The somnolency increases to coma from which the patient is roused with difficulty or not at all. If not complete, the answers to questions are slow, hesitating, and in monosyllables. The facial expression is abolished; the eyes are often open and staring. Vision is lost. The pupils are dilated, sometimes unequally, and respond feebly, if at all, to light. Toward the close of life the pulse becomes frequent and feeble. There is incontinence of urine. The temperature, as measured by the thermometer, varies in different cases, sometimes persisting from two to three degrees above the normal maximum, occasionally rising higher, often fluctuating, and, in some cases, before death, falling below the normal minimum. In the latter part of the disease, in addition to ischæmia and œdema of the optic disk, the ophthalmoscope shows neuro-retinitis in a considerable proportion of cases.

The duration varies from eight or ten days to four or five weeks. After the occurrence of the symptoms of depression, it is not uncommon for a notable amelioration of the condition of the patient to take place, so that the friends, and even the physician, may be led to entertain delusive hopes of recovery. There is very general agreement among medical writers as to the utter hopelessness in cases of this disease. When cases have appeared to end in recovery, it has been considered as a more rational supposition that the diagnosis was erroneous than that the disease had this ending. Of course, if the ground be taken that recovery is proof of a faulty diagnosis, the disease must always prove fatal. The author agrees with Clifford Allbutt in the belief that this extreme view is untenable. It is certainly not unreasonable that tubercles may occur in the pia mater and give rise to meningitis which has a favorable termination, the tubercles afterward either disappearing or being tolerated without inconvenience. Cases analogous to those described by Allbutt have fallen under the author's observation.[1] In the symptomatology which has been given, reference has been had chiefly to its occurrence in childhood. It occurs, however, as already stated, after that age, in connection with an antecedent pneumonic phthisis. If, in a well-marked case of phthisis, the symptoms of meningitis become developed, it is a fair conclusion that the latter affection is tuberculous. Now, a case with the following historical facts has recently been observed by the author: A girl, aged about sixteen, had the unmistakable symptoms and signs of pneumonic phthisis. In this case there occurred intense persistent cephalalgia, with a high temperature, intolerance of light and sound, double vision, slight strabismus, and vomiting. Under the treatment with the bromides and the iodide of potassium, these cerebral symptoms disappeared, the patient improved sufficiently to go out of doors, and died several months afterward from the progress of the pulmonary affection, without any return of the evidence of meningeal inflammation. There was no autopsy in this case, but it is a rational conclusion that an intercurrent tuberculous meningitis occurred which ended in recovery. This case was observed with the author's colleague, Prof. James R. Wood. Assuming, however, the possibility of recovery, it must be admitted that the instances are so rare as to afford very little ground for hopefulness in individual cases; and it is but too true that the liability to error in diagnosis is a better basis of hope than the possibility of recovery if the diagnosis be correct.

Other affections, doubtless, have been erroneously considered as tuberculous meningitis in some of the cases of supposed recovery from the latter. Tuberculous and simple meningitis are liable to be confounded at the bedside. The chief differential points, already mentioned, are the prodromic period in cases of the former, the absence of any appreciable causation, the lesser intensity of fever as indicated by the thermometer, and the fact of delirium and convulsions being more infrequent in the first stage, owing to the basilar situation of the inflammation. To these may be added the infrequency of tuberculous meningitis under two years of age, although that period of life is not exempt, and the fact that the disease occurs especially in children having a scrofulous constitution, which perhaps is inherited.

---

[1] *Vide* "On the Use of the Ophthalmoscope in Diseases of the Nervous System and of the Kidneys."

The disease is to be differentiated in children and adults from typhoid fever. The negative points are the absence of the abdominal symptoms of the latter, namely, diarrhœa, tympanites, iliac tenderness, splenic enlargement, and of the eruption. On the other hand, the ophthalmoscopic appearances, motor paralysis, hyperæsthesia of the special senses and of general sensibility, vomiting, infrequency of the pulse, and disturbance of the rhythm of respiration—symptoms which are pretty constant and prominent in meningitis—do not belong to the clinical history of typhoid fever.

In some cases of colo-enteritis or cholera infantum, cerebral symptoms occur which simulate those of meningitis. They proceed either from exhaustion, or, as held by J. Lewis Smith, from congestion and serous effusion. The names hydrencephaloid and spurious hydrocephalus have been applied to this condition. These names apply to the condition as presented in children. An analogous condition probably occurs after the infantile age and in persons of advanced years; it will be referred to in another connection under the name cerebral exhaustion. The symptoms are somnolency or even coma, disturbance of the rhythm of respiration, infrequency and perhaps irregularity of the pulse, and prostration. The points of difference, as compared with meningitis, are the absence of the symptoms of cerebral excitation, namely, cephalalgia, photophobia, etc.; the absence of high fever, of paralysis, and of the ophthalmoscopic appearances; the existence of antecedent affections or causes which account for the cerebral condition.

Writers speak of intestinal worms as giving rise to symptoms which may lead to the error of diagnosticating tuberculous meningitis. But, in opposition to a traditional doctrine, worms very rarely occasion notable cerebral disturbance, and never the ensemble and the order of events which are diagnostic of meningeal inflammation. However, whenever this etiological question arises, it is settled by the effect of an efficient vermifuge.

Treatment of Tuberculous Meningitis.

The symptoms, in cases of meningeal inflammation dependent on tuberculous disease, very rarely, if ever, denote an intensity which furnishes indications for the abstraction of blood. Writers and practitioners are generally agreed on this point. Active purgatives and counter-irritation are contraindicated. This statement probably applies to mercury. There is ground for the belief that the iodide of potassium may be useful, and it should therefore enter into the treatment. Cephalalgia, restlessness, and insomnia are to be palliated by the bromides, and, if necessary, by opiates. Palliation and support are the chief objects to which therapeutical measures are to be directed.

ACUTE SPINAL MENINGITIS AND ACUTE MYELITIS.

Of intra-spinal inflammatory affections, acute meningitis will be here considered, together with the points involved in the differentiation of acute myelitis. Other spinal diseases will be embraced in the group of paralytic and ataxic diseases. By the name acute spinal meningitis is to be understood an inflammation seated in the pia mater of the cord; but the inflammation extends thence more or less to the substance of the cord, just as the brain participates in inflammation of the cerebral meninges. In fact, the important symptoms in spinal, as in cerebral, meningitis, relate to the nervous structure rather than to the meninges. Spinal meningitis is, therefore, in reality, meningo-myelitis.

The local diagnostic symptoms are pain referred to the spine, and thence to the limbs; the pain increased by movements of the body, and not in all cases affected by pressure or percussion upon the spinal column; contractures or spasms affecting the muscles of the back (opisthotonos), and the lower or the upper extremities, or both; increase of the sensibility to touch and pain of the cutaneous surface (hyperæsthesia and hyperalgesia); dyspnœa in some cases, caused by spasmodic rigidity of the thoracic muscles, and sometimes dysphagia. With these local symptoms there is fever as denoted by the thermometer; the increase of temperature, however, is not very great. With increase of temperature, the action of the heart is sometimes diminished in frequency.

These are the symptoms in the first stage. Compression of the cord by inflammatory products—lymph and serum—may cause either general paralysis or paraplegia. Paralysis, however, is not a constant symptom, and is rarely complete. Reflex movements may generally be produced, and the electrical excitability of the muscles is not lost unless the cord be considerably involved.

The diagnostic points in the differentiation from acute myelitis or from myelo-meningitis, the myelitis predominating, are as follows: The pain referred to the spine in these affections is less; pain may be wanting, save when pressure or percussion is made, and movements of the body occasion less suffering; the pain which exists is less diffused, that is, it is localized either in an isolated part or in several distinct parts; hyperæsthesia and hyperalgesia are either less marked or wanting. These differential points relate to an early period of the disease. Paralysis occurs more constantly and earlier. The paralysis is partial or general according to the situation and extent of the inflammation. Contractures, spasms, and convulsions may occur, but they accompany or follow the paralysis. The paralysis is greater in degree than in acute spinal meningitis, and it may be complete. Reflex movements and the electric excitability of the muscles are impaired or lost if the myelitis affect the inferior portion of the cord.

The contractions of the muscles and spasms, in some cases of acute spinal meningitis, bear an analogy to those of tetanus. In the former disease, however, fever is more or less marked at the outset; whereas, in the latter, it is at first wanting, the increase of temperature being incident to the convulsions. A febrile temperature suffices to exclude all purely functional convulsive affections.

Except as an element of cerebro-spinal meningitis, acute inflammation of the meninges of the cord is one of the rarest of diseases. In the few cases which occur, it is almost always either traumatic or secondary to some other affection. It is sometimes developed in connection with acute articular rheumatism, and after confinement. It may be caused by exposure to cold and by violent muscular efforts.

Treatment of Acute Spinal Meningitis and Acute Myelitis.

The disease is one of great gravity, proving fatal, in a large majority of cases, after a duration of from two or three days to a week. The proportion of recoveries is, however, somewhat larger than in cases of acute cerebral meningitis. The immediate cause of death, when it ends fatally after a short duration, is apnœa from spasm of the respiratory muscles.

The treatment is essentially the same as of acute cerebral meningitis. The abstraction of blood, either by venesection or locally over the spine, is rendered appropriate by similar considerations; and this is also to be said of the employment of mercury. Cold applications over the spine are advisable in the first stage. The presence of inflammatory products furnishes an indication for the iodide of potassium. Pain, spasms or convulsions, and insomnia call for opiates and the bromides. Supporting measures are indicated by symptoms which denote failure of the vital powers.

The treatment of acute myelitis does not differ materially from that of acute spinal meningitis.

II.

DISEASES GIVING RISE TO SUDDEN OR APOPLECTIC COMA.

CEREBRAL HYPERÆMIA. CEREBRAL AND MENINGEAL HEMORRHAGE. HÆMATOMA OF THE DURA MATER. THROMBOSIS AND EMBOLISM. CEREBRAL EXHAUSTION. URÆMIA. INSOLATION.

AN important point of difference among the affections giving rise to coma, is its occurrence suddenly or more or less slowly. If it occur slowly, it is preceded for a greater or less period by somnolence. The term apoplexy signifies, derivatively, sudden coma. It should be used in this sense; but it has been applied to the extravasation of blood, not only in the brain, but in other situations, *e. g.*, pulmonary apoplexy. Restricting the sense of the term to coma induced either by cerebral hemorrhage or other pathological conditions, sudden or apoplectic coma may conveniently, with reference to diagnosis, be made the basis of a subdivision of the affections embraced under this heading.

CEREBRAL HYPERÆMIA.

Hyperæmia or congestion may undoubtedly give rise to apoplexy, although the instances are rare. The apoplectic seizure is generally, but not invariably, preceded by symptoms representing the lighter form of hyperæmia, namely, cephalalgia, dizziness, mental confusion, flushing of the face, abnormal sensitiveness to light and sounds, insomnia, and strong pulsation of the carotids. What is commonly known as a "rush of blood to the head," induced by mental excitement and other obvious causes, or without any appreciable causation, is a pathological condition which, increased to a certain degree, occasions apoplexy. The term congestive apoplexy expresses this condition. The prodromic symptoms form a part of the diagnostic evidence. Some persons are constitutionally prone to cerebral congestion; and this fact, in individual cases, has weight in the diagnosis. The existence of hypertrophy of the heart without compensatory valvular lesions is a diagnostic element. The author has reported a case of fatal apoplexy having this etiological connection.[1] The absence of hemiplegia excludes cerebral hemorrhage. As a rule, hemiplegia is absent. To this rule there are exceptions which it is not easy to explain. The comatose condition may continue for a few moments only, or for several hours. It may prove quickly fatal, as in a case reported by the author.[2] In the majority of cases, patients emerge from the coma, and nothing remains except a certain amount of nervous debility. In some cases of insolation, the apoplectic coma is fairly attributable to cerebral congestion, as shown by the treatment which appears to conduce to recovery, and, in fatal cases, by the post-mortem appearances. The coma caused by cerebral congestion may be complete or incomplete; if the latter, the patient is capable of being roused to partial consciousness. In cases of complete or profound coma, the respirations are stertorous, the facies may show cyanosis, the frequency of the pulse is diminished, and its characters denote strong arterial tension. The differentiation from cerebral hemorrhage, in some cases, is only practicable by the absence of hemiplegia, which is a constant symptom in the latter; whereas it occurs as a rare exception to the rule in connection with congestive apoplexy.

CEREBRAL HEMORRHAGE.

Apoplexy is caused by hemorrhage into the brain-substance oftener than by the other affections in this group collectively. French writers limit the sense of the term cerebral apoplexy to this etiological connection. As a rule, an extravasation of blood into the substance of the brain does not occur without an apoplectic seizure. There are exceptions to this rule; in the exceptional instances the quantity of extravasated blood being small and the extravasation taking place slowly. As regards the symptomatology and the prognosis, the amount of the hemorrhage is important. The amount varies from that sufficient to occupy a space of the size of a pea, to a quantity which involves destruction of the greater part of an entire hemisphere. It may be added that, in the great majority of cases, the situation is either the corpus striatum or the thalamus optici, the former much oftener than the latter. With reference to variations in symptoms, it should also be stated that the immediate cause of the hemorrhage relates to the vessels, their giving way being dependent on either miliary aneurisms or atheromatous degeneration; but that, in certain cases, important factors are hyperæmia and increased arterial tension.

---

[1] *Vide* Treatise on Diseases of the Heart, second edition, page 31.

[2] *Vide* Principles and Practice of Medicine, fourth edition, page 605.

In a large, perhaps the larger, proportion of cases, the occurrence of the hemorrhage is not preceded by any premonitory symptoms, being due, in these cases, to the changes in the vessels alone. It may follow so directly an exciting cause that there is no time for prodromata. This was illustrated in a case which came under the author's observation, in which the apoplectic attack took place in the venereal act. Premonitory symptoms, when present, denote cerebral hyperæmia, and the exciting causes are those which induce this condition. In some cases, the coma takes place so suddenly that the patient falls to the ground as if struck by lightning or felled by a blow. In other cases, some minutes elapse before the patient becomes comatose. As a rule, the coma is complete; there is absolute loss of consciousness; the breathing is often, but not invariably, stertorous; the cheeks are sometimes sucked inward with inspiration and puffed outward with expiration. The heart's action is diminished in frequency, and is sometimes irregular, as in cases of congestive apoplexy. Convulsive movements sometimes occur, which may be unilateral; vomiting is a frequent occurrence. The term sanguineous apoplexy has been used to distinguish apoplectic coma caused by hemorrhage from that which is an effect of simple hyperæmia or other morbid conditions.

The feature which distinguishes sanguineous from congestive apoplexy, and also from meningeal hemorrhage and uræmia, is hemiplegic paralysis. The hemiplegia is coincident with the coma. In some instances the patient is sensible of the paralysis for a few minutes before consciousness is lost. In a patient who had an apoplectic seizure while conversing with the author, the paralysis preceded the coma for about half an hour, the mind, in the mean time, being confused. If, as is often the case, the movements of the voluntary muscles of the extremities are not completely suspended, the patient is observed to move the upper and the lower limb on one side, the members on the other side remaining motionless. When the paralyzed limbs are raised and allowed to fall, they drop lifeless-like. In many instances the lowering of the angle of the mouth on one side, and the limitation of muscular movements to, or their predominance on, the opposite side, show that the facial muscles are involved. The cutaneous sensibility of the paralyzed side may be the same as on the side not paralyzed, or there may be more or less anæsthesia, which, if the patient recover from the apoplectic seizure, shortly disappears, in the great majority of cases, the motor paralysis remaining. Other points relating to the hemiplegia will be mentioned when this form of paralysis is considered in connection with the paralytic affections. The occurrence of hemiplegia is an important fact in differentiating the affections which give rise to apoplectic coma. If the coma be accompanied by hemiplegia, the diagnosis lies between cerebral hemorrhage and thrombosis or embolism; the instances in which hemiplegia accompanies cerebral hyperæmia, meningeal hemorrhage, and uræmia being so rare that they may practically be disregarded. The fact that apoplexy from cerebral hemorrhage rarely occurs in persons under forty years of age, is of importance in differentiating this affection from embolism. This differential diagnosis will be further considered in connection with the latter affection.

MENINGEAL HEMORRHAGE.

This term is to be understood as meaning a subarachnoid hemorrhage, that is, on the surface of the brain, in the meshes of the pia mater; the blood, however, may escape thence into the arachnoid cavity. Meningeal hemorrhage is sometimes found in children who die immediately, or soon after, birth. It is produced traumatically by the contractions of the uterus in prolonged or forcible labors, and sometimes by the pressure of the forceps in cases of instrumental delivery. If death be immediate, the symptoms are those of apnœa or asphyxia. When life is prolonged for several days, coma and convulsions precede death.

Irrespective of its occurrence in the newly-born, meningeal hemorrhage, giving rise to apoplectic coma, is extremely rare, save as a result of direct injuries of the cranium. It may result from the rupture of aneurisms of the basilar and the middle cerebral arteries, the hemorrhage taking place at the base of the brain. It is sometimes an effect of thrombosis of the superior longitudinal sinus. The author has reported a case of the former, in which sharp spiculæ projecting from the inner surface of the skull, penetrated the dura mater, and, wounding vessels on the surface of the brain, gave rise to a fatal apoplectic seizure. Local causes, in some instances, are not discoverable.

Apoplexy due to meningeal hemorrhage presents cerebral symptoms identical with those in cases of cerebral hemorrhage, except that hemiplegia is generally wanting. There are no prodromata on which can be based any expectation of the apoplectic attack. Vomiting is a very constant symptom. The apoplexy is not preceded nor accompanied by the symptoms of cerebral hyperæmia. This fact excludes apoplexy from the latter condition, and the absence of hemiplegia excludes cerebral hemorrhage, together with thrombosis or embolism of the middle meningeal artery, but not of the basilar artery. Occlusion of the latter, as will presently be seen, gives rise to apoplexy without hemiplegia. Whenever meningeal hemorrhage is sufficient to cause apoplectic coma, the latter, as a rule, persists, and death takes place within a few hours or days.

HÆMATOMA OF THE DURA MATER.

The hemorrhage associated with inflammation of the inner layer of the dura mater (pachymeningitis interna) is called hæmatoma. The blood is encysted (hæmatoma saccatum). The cysts vary in number and size. They contain a quantity of blood varying from an ounce to a pound. They are situated on the convexity of the brain, between the dura mater and the arachnoid, and are either confined to one side or they exist on both hemispheres. The occurrence of hemorrhage rapidly, may give rise to apoplectic coma. If, as not infrequently happens, successive hemorrhages occur, there may be a corresponding series of apoplectic attacks.

The diagnosis in cases of apoplexy from this affection is to be based, in a measure, upon premonitory symptoms which represent pachymeningitis prior to the occurrence of the hemorrhage. These are cephalalgia, which is persistent, and often severe; vertigo, tinnitus aurium, insomnia, muscular weakness, and contraction of the pupils. The last-named symptom has considerable significance taken in connection with other circumstances. The period during which the symptoms of pachymeningitis precede the hemorrhage, varies from several weeks to several months. The symptoms, however, in some cases are so slight as not to attract much attention, or they are wanting, and, under these circumstances, if the first attack of apoplexy prove fatal, the nature of the affection cannot be ascertained until it is disclosed by the scalpel.

The apoplectic attack is not characterized by the appearances which denote active cerebral congestion. The pupils remain contracted, but the contraction is now often unequal on the two sides, showing that the hæmatoma is either limited to, or predominates on, one side. In a certain proportion of cases hemiplegia occurs. The paralysis is sometimes limited to the facial muscles of one side. Contracture of the muscles of the extremities is sometimes observed.

The previous occurrence of coma once or repeatedly, either sudden or gradual, the patient manifesting in the interim symptoms of an intracranial affection, is of much diagnostic significance. Periods of prolonged somnolency, which occur in some cases during the progress of pachymeningitis, are also significant.

Age is to be considered in the diagnosis. The affection occurs chiefly in persons more or less advanced in years, and especially in drunkards. It is sometimes observed in children. It may be due to traumatic causes. It is apt to be associated with cerebral changes in cases of insanity, and of progressive general paralysis. It is a very rare intercurrent affection in cases of rheumatism, as also in different febrile and inflammatory diseases.

THROMBOSIS AND EMBOLISM.

Apoplectic coma from occlusion of a cerebral artery requires that the circulation through the vessel be abruptly arrested. This seldom happens when the obstruction is caused by a thrombus; that is, when the obstructing plug is fibrin which has coagulated within the obstructed vessel (autochthonous). Usually in thrombosis the circulation is arrested more or less slowly. An embolus, on the other hand, formed in either the left side of the heart, an aneurismal sac, or an atheromatous aorta, produces an instantaneous occlusion of the artery in which it is lodged. As a rule, therefore, apoplexy falling in this subdivision implies embolism.

In cases of embolic apoplexy, the middle meningeal artery is usually the seat of the obstruction. The embolus lodges in this artery much oftener on the left than on the right side, owing to the more direct route from the aorta on the left side. The sudden coma has no premonitions, as the detachment of the embolus and its transportation by the blood-current, are entirely independent of any morbid conditions within the skull. The symptoms of the apoplectic attack are, in the main, the same as in apoplexy from cerebral hemorrhage. The appearances do not denote cerebral hyperæmia, but this is true in certain cases of sanguineous apoplexy. It is perhaps correct to say that while these appearances are not necessary to the diagnosis of the latter, they exclude embolism. Hemiplegia invariably occurs. This symptom is common to cerebral hemorrhage and to embolic apoplexy. The diagnosis of each is to be based on points which go to establish the existence of one, and to exclude the other. Attention is therefore to be directed especially to the differentiation of these two affections.

Embolism occurs much oftener prior to, than after, middle life, although the latter period is not exempt from the liability to its occurrence. On the other hand, cerebral hemorrhage is rare under forty years of age. In much the larger proportion of cases the embolus is lodged in the meningeal artery on the left side, causing right hemiplegia, whereas cerebral hemorrhage occurs in the right as often as, and perhaps oftener than, in the left hemisphere. It follows that aphasia is more frequently an effect of embolism than of hemorrhage. The existence of valvular lesions of the heart affords a presumption for, and their non-existence is evidence against, embolism. It follows that the fact of the patient having had acute articular rheumatism, is presumptive evidence of embolism. Apoplexy from embolism is rarely fatal, and, as a rule, the patient emerges from the coma within a short period; long persistence of the comatose condition and death, therefore, render hemorrhage probable. Rapid improvement as regards the hemiplegia after the disappearance of coma, is frequent in embolism, and comparatively rare in hemorrhage. Complete recovery from the paralysis takes place in cases of embolism, and seldom, if ever, in cases of hemorrhage. After hemorrhage there is a febrile temperature accompanied by cephalalgia and sometimes delirium, these symptoms denoting a local cerebritis induced by the clot. It is stated that the temperature rises after embolism, sometimes attaining to a considerable elevation. It may be doubted if this be the rule; and the local symptoms of cerebritis are wanting. Finally, so far as chances are concerned, based on the relative frequency of embolism and hemorrhage, they are in favor of the latter.

Occlusion of the basilar artery from thrombosis may give rise to apoplectic coma, and terminate life within a short period. An instance has fallen under the author's observation. In another instance, an apoplectic attack occurred from which the patient recovered, and, death taking place two months afterward, thrombosis of the basilar artery was ascertained post-mortem. A synopsis of this case is as follows: A male patient in Bellevue Hospital, about forty years of age, had had hemiplegia for sixteen months. It occurred suddenly, and was attributed to embolism, but the autopsy showed that hemorrhage had taken place in the corpus striatum. He had aortic lesions with enlargement of the heart, and renal disease which was found to be waxy degeneration. He had improved as regards the hemiplegia up to a certain degree, at which the paralysis remained stationary. While sitting in a chair he was noticed to become somnolent, and he shortly fell from the chair unconscious. He had some convulsive tremor. He emerged from the coma slowly, and in about a week regained the condition in which he was prior to this apoplectic seizure. There was no increase of the hemiplegia. Two months afterward he died suddenly with acute pulmonary œdema, and, on examination after death, the basilar artery was found to be occluded by a thrombosis.

Apoplexy from thrombosis of the basilar artery is unaccompanied by hemiplegia, and is liable to be attributed to meningeal hemorrhage or cerebral congestion. In the foregoing case the latter affection was considered as the probable causative condition prior to the autopsy. Jaccoud states that the occlusion of this artery does not give rise to any disturbance of intelligence. This is not true of all cases, as shown in the instance just stated, and other instances of fatal apoplexy thus induced which have been reported. According to that author, the movements of the tongue are affected by either ataxia or paralysis, and vertigo with vomiting is generally present. A positive diagnosis could hardly be based on these symptoms.

CEREBRAL EXHAUSTION.

In the absence of any better pathological explanation than that implied by the above term, it is selected to designate certain cases of sudden coma not referable to other affections. In illustration of the variety of apoplexy thus designated, the salient points of a case observed in 1876 are as follows: The patient, a man aged about fifty-five, weighing nearly three hundred pounds, had for some time been engaged in intense mental labor continued during the day and far into the night. He had arisen in the morning, and was preparing to join his family at breakfast. He was found lying unconscious on the floor, having fallen while in the act of shaving. His family physician saw him very soon after the attack. He could be partially roused for an instant, relapsing immediately into coma. The pupils were neither contracted nor dilated, and were mobile. Deglutition was unaffected. There was no stertor and no paralysis. The appearances of congestion were wanting. The pulse was regular, and without the characters denoting arterial tension. The urine had recently been examined with a negative result. In the evening, when seen by the author in consultation, his condition had remained the same as in the morning. He could not be roused sufficiently to protrude the tongue. The coma had the appearance of quiet sleep. Coffee and nourishment constituted the treatment. On the following day he was conscious, and perfectly rational. The preceding twenty-four hours were an entire blank to him. There were no signs of cardiac lesions, fatty degeneration being excluded by a normal intensity of the first sound over the apex. He recovered without any untoward symptom. The author has recently met with a very similar case, the patient being a married woman about fifty years of age. Hysteria was excluded in this case. The pathological condition here denominated cerebral exhaustion is probably a prominent element in certain cases of insolation.

The diagnosis of apoplectic coma from cerebral exhaustion requires the exclusion of hyperæmia, cerebral hemorrhage, and embolism. The transient duration of the coma, and recovery with no symptoms remaining which denote cerebral disease, exclude meningeal hemorrhage and hæmatoma. Thrombosis of the basilar artery, giving rise to coma ending in recovery, is not easily excluded, and it would be difficult to disprove an assertion that cases of cerebral exhaustion belong in this category.

URÆMIA.

Uræmic coma, in rare instances, occurs suddenly, and, it may be, without any premonitions pointing to uræmia. The existence of renal disease may not have been suspected prior to the apoplectic seizure. Generally the speedy occurrence of epileptiform convulsions distinguishes this from the other affections characterized by sudden coma. In cases of doubt, urine should be at once obtained by means of the catheter, and examined with reference to the presence of albumen. Albumen may, however, not be present, and the coma nevertheless be uræmic, for albuminuria is sometimes wanting in cases of that form of renal disease most likely to give rise to coma, namely, the cirrhotic kidney. If practicable, the specific gravity of the urine should be ascertained. A low specific gravity renders the existence of uræmia probable. Absence of urine within the bladder is a ground for suspicion, but is not entitled to much weight, as the patient may have urinated shortly before the attack of coma. The fact that the coma is unaccompanied by hemiplegia, excludes cerebral hemorrhage and embolism.

INSOLATION.

In certain cases of insolation, or sunstroke, the coma is probably due to cerebral exhaustion. The diagnostic symptoms of the latter are present in these cases. In other cases the symptoms are those of cerebral hyperæmia, or congestive apoplexy; and this is, in fact, the pathological condition. Notable increase of the body-heat characterizes certain cases; hence the significance of the name thermal or heat-fever. The author has treated a case in which the axillary temperature was 110½° Fahr.

Clinically, all cases of coma induced by heat, in conjunction generally with other causes, are embraced under the name insolation or sunstroke. They occur during "heated terms," especially in tropical climates, but not always as a direct effect of exposure to the solar rays. Persons suddenly becoming unconscious are sometimes supposed to have a sunstroke, when the coma is due to conditions not caused by heat. Cases of alcoholic intoxication are brought into hospitals as cases of insolation, and, also, cases of cerebral hemorrhage, embolism, and uræmia. These affections are without much difficulty excluded. As the source of indications for treatment, it is important to take account of the symptoms in different cases of insolation. The symptoms denote cerebral hyperæmia when the respiration is stertorous, the face flushed, the pulse diminished in frequency, and its characters showing arterial tension. On the other hand, cerebral exhaustion is to be inferred from feebleness and frequency of the heart's action. A high temperature furnishes a leading therapeutic indication.

The physician is sometimes called upon to diagnosticate the affections causing coma, when it is not known whether it occurred suddenly or not; the patient is found in a comatose condition, and the previous history cannot be ascertained. Patients are often brought into hospitals unconscious, with no clue from attending circumstances which lead to a knowledge of the causation. The differential points involved in the discrimination of the different affections giving rise to sudden coma are to be considered, and, in addition, the diagnostic characters of affections which give rise to coma more or less slowly. The latter affections are epilepsy, alcoholic intoxication, narcotism, and hysteria. The diagnosis of these affections will be considered presently. In all cases, the head should be carefully examined for traumatic causes. Cases of supposed death from apoplexy sometimes occur, in which fracture of the skull had been overlooked. It has happened not infrequently that persons have been received into station-houses who were thought to be "dead drunk," and left to die without medical aid, the termination and the autopsy revealing some one of the different affections giving rise to apoplexy. The importance of providing for a proper medical examination in all such cases is sufficiently obvious.

TREATMENT OF DISEASES GIVING RISE TO SUDDEN COMA.

The indications for treatment in the different affections in this subdivision are by no means the same, and each affection, therefore, claims separate notice.

Treatment of Sudden Coma from Cerebral Hyperæmia.

Assuming the hyperæmia to be active, which it certainly is in most cases, bloodletting is indicated. Its supposed evils are of no moment, taken in connection with the importance of promptly diminishing the power of the heart's action, the arterial tension, and the intracranial compression. The urgency of the indication is in proportion to the evidence afforded by the symptoms of the degree of the conditions just named. Between childhood and advanced age, venesection is the preferable mode of abstracting blood; in children and aged persons, leeches may be employed. As regards the quantity of blood to be abstracted, the physician is to be guided by the indicating symptoms and the immediate effects. The bowels should be moved by an active cathartic, and, on account of the promptness and efficiency of its action, the croton oil is preferable to any other. The feet should be immersed in a stimulating foot-bath, or the limbs may be wrapped in cloths wrung out in hot mustard water. A sinapism may be applied to the back of the neck. Dry cups applied to the neck or chest act efficiently in the way of derivation. Cold applications to the head, either by means of the ice cap or constant sponging with ice-water, should be steadily employed. The head and shoulders should be elevated, and the apartment kept cool and freely ventilated.

These measures are to be employed prior to the recovery of consciousness. After the coma disappears, the indications relate to the pathological conditions which remain, and circumstances standing in a causative relation to the affection.

Treatment of Sudden Coma from Cerebral Hemorrhage.

The symptoms in different cases of sanguineous apoplexy differ materially, and, corresponding to these differences, the therapeutical indications not only vary, but they are quite opposite in character. In some cases the symptoms denote active hyperæmia, and it is reasonable to consider this condition as an exciting cause of the hemorrhage. The objective point in the treatment of these cases is the hyperæmia. The same measures are to be employed which are indicated in simple hyperæmia, but, in view of the fact that the brain contains extravasated blood, the measures are not to be carried to the same extent. On the other hand, not only are the symptoms of hyperæmia wanting in some cases, but the face is pallid and the action of the heart feeble and irregular. It is not sufficient, therefore, to say of all the cases belonging in the latter category that bleeding, etc., are contraindicated; it may be important to increase the force of the heart's action by alcoholic stimulation. It would be a grave error to treat alike all cases of this form of apoplexy. If the face be flushed, the pulsations of the carotids strong, the radial pulse denoting power of the heart's action with arterial tension, and especially if, with these symptoms, the patient be of middle age and robust, venesection and the other measures indicated in hyperæmia are to be employed. Per contra, if the face be pallid, the heart's action feeble, and especially when, in addition, the patient has a feeble constitution, alcoholics should take the place of depletory and depressing measures. If the indications on the one hand for depletion, and on the other hand for stimulation, be not present, active treatment of any kind is to be avoided; it suffices to see that the patient is kept perfectly quiet, and that ventilation, temperature, etc., are properly attended to.

If the patient survive the apoplexy, the case is one of hemiplegia dependent on a clot in the brain, and the treatment is that of paralysis thus induced.

After a cerebral hemorrhage, the liability to a recurrence is to be considered with reference to prophylaxis. There are no measures of treatment which will remove the changes in the vessels on which depends their giving way, namely, atheroma, calcareous degeneration, and miliary aneurisms. Causes, however, other than these changes, may be to a certain extent controlled. Excitation of the heart, increase of arterial tension, and congestion of the brain—active or passive—from any causes, may determine the occurrence of hemorrhage. Violent muscular exercise, mental excitement, the abuse of alcohol, over-repletion of the stomach, and constipation, therefore, are to be avoided. It is proper to warn patients of the danger. At the same time, they should not be unduly depressed by being led to expect that a renewal of the apoplexy will certainly occur sooner or later. The fact that, in a certain proportion of cases, the hemorrhage does not recur, is a rational ground for encouragement, to which patients are entitled the more because it is impossible, in individual cases, to estimate with any approach to accuracy the degree of danger.

Treatment of Sudden Coma from Meningeal Hemorrhage and Hæmatoma of the Dura Mater.

Were it practicable to reach a positive diagnosis in all cases of these affections, there would be no indications for treatment, save those derived from the symptoms in each case. Hyperæmia calling for active therapeutical measures is rarely, if ever, present.

Treatment of Sudden Coma from Embolism and Thrombosis.

In this variety of apoplectic coma, the requirement for the recovery of consciousness being the restoration, in a certain measure, of the circulation within the area supplied with blood by the obstructed artery, venesection together with other methods of depletion and derivative measures are contraindicated. The treatment indicated by cerebral hyperæmia is hurtful. The object is to promote the intracranial circulation. If the action of the heart be feeble, cardiac stimulants are indicated. Cold applications to the scalp do harm. The head and shoulders should not be much raised. Alimentary support is useful. As a rule, the coma disappears in a short time, and the same measures are then indicated in order to prevent the changes incident to defective nutrition within the affected portion of the brain. On the prevention of these changes depends the recovery from hemiplegia; it may be also from aphasia and permanent impairment of the mental faculties.

Treatment of Sudden Coma from Cerebral Exhaustion.

It is obvious that in coma from this pathological condition, all measures which tend to weaken the circulation are injurious. On the contrary, supporting measures of treatment are indicated.

Treatment of Sudden Coma from Uræmia.

In uræmic coma the elimination, promptly and efficiently, of urinary principles from the blood, is the important object of treatment. The measures for the accomplishment of this object have already been considered (*vide* page 414).

Treatment of Sudden Coma from Insolation.

The indications for treatment in the cases which are generally embraced under the name insolation or sunstroke, differ according to the symptoms. Bloodletting and cold applications to the head are indicated if the symptoms denote cerebral hyperæmia. The abstraction of blood is sometimes promptly efficacious in these cases, as the author can testify from his own observations. If, on the other hand, the symptoms denote exhaustion, the action of the heart being frequent and feeble, bloodletting is contraindicated, and alcoholics may sometimes be given with advantage. In the former cases there is notable disturbance of breathing and cyanosis, death taking place by apnœa. In the latter cases the mode of dying is by asthenia. A high temperature calls for prompt and efficient measures to abstract heat. Wrapping the body in a wet sheet, and sprinkling, at intervals of a few moments, with cold water by means of an ordinary garden sprinkling-pot, is a readily available and effective method. Cases in Bellevue Hospital in 1872 were treated by the author in this way with much success. The refrigeration is to be kept up until the thermometer shows considerable reduction of temperature, and is to be repeated as often as the temperature again rises. Sponging of the body suffices if the existing temperature is not above 104° Fahr.

III.

DISEASES GIVING RISE TO COMA MORE OR LESS SLOWLY.

HYPERÆMIA. THROMBOSIS. CEREBRAL EXHAUSTION. HÆMATOMA AND URÆMIA. CHRONIC CEREBRAL MENINGITIS. EPILEPTIC COMA. HYSTERICAL COMA. CATALEPTIC COMA. ALCOHOLIC COMA. NARCOTIC COMA.

In this group are embraced affections of which coma occurring, not suddenly, but more or less slowly—that is, preceded by somnolence—is a prominent or leading feature. Among these affections are most of those which have just been considered as giving rise to sudden coma, namely, hyperæmia of the brain, arterial thrombosis, cerebral exhaustion, hæmatoma, and uræmia.

Hyperæmia, either active or passive, having various pathological and etiological relations, occurs in what may be distinguished as its lighter forms. These may precede the more or less slow development of coma, and a fatal termination. The recognition of the lighter forms of hyperæmia, therefore, is of importance. The first object in the diagnosis is to determine that certain cerebral symptoms, namely, cephalalgia, dizziness, mental confusion, etc., depend on simple congestion—that is, congestion not associated with any other cerebral affection. This object is reached by the exclusion of other affections. They are excluded by the absence of a persistent localized pain, and of paralysis or aphasia. The long duration of cerebral symptoms without the evidence of lesion afforded by paralysis, is a strong point in referring the symptoms to simple congestion. The next object is to differentiate active and passive hyperæmia. In active hyperæmia are present symptoms the same in character, but less pronounced, as in cases of congestive apoplexy. Passive hyperæmia gives rise to symptoms the opposite of those denoting excitation, namely, dulness and indisposition to the exercise of the mental faculties, with tendency to somnolence, which is incomplete and unrefreshing. Typical illustrations of passive congestion, or hyperæmia by stasis, are observed in cases of dilatation of the right side of the heart, in cases of an aneurismal or other tumor which presses upon the superior vena cava, and in paroxysms of epilepsy. The amount of congestion which exists in some of these cases without grave consequences, is significant of the tolerance of this pathological condition. The term "congestion of the brain," like "hepatic congestion," "congestion of the lungs," etc., is often applied to cases in which there is no positive evidence that this condition exists, or, if present, that it is causative of the symptoms attributed to it.

Somnolence and coma may represent passive congestion incident to thrombosis of the intracranial venous sinuses. These symptoms are preceded by vomiting, mental oppression, and dilatation of the pupils. The obliteration of the longitudinal sinus may give rise to epistaxis and exophthalmia. If the thrombosis affect the lateral sinus on one side, the volume of the external jugular vein on the affected side is diminished, and increased on the unaffected side. The fatal coma developed more or less slowly in some of the cases of the so-called hydrocephaloid affection (marantal thrombosis) of children, and occurring in adults as well as in children during the course of various diseases which involve prolonged feebleness of the heart's action, is attributable to venous thrombosis. The occurrence of this event explains the fatal coma in some cases of injury or diseases of the skull, the formation of thrombi being, in these cases, attributable to phlebitis.

Abercrombie described, many years ago, cases of slowly developed fatal coma, in which cerebral hyperæmia was the only condition found after death. The symptoms of inflammation were wanting in these cases. The patients became somnolent without appearing to have any grave disease. The somnolency increased, eventuating in coma, the latter becoming profound, and continuing until death. Uræmia was but little understood when Abercrombie wrote, and it is a rational supposition that these were cases of uræmic coma. The author had met with cases corresponding to those described by Abercrombie before our knowledge of uræmia was sufficient to enforce the importance of examinations of the urine during life, and of the kidneys after death, in order to discover a pathological connection with renal disease. Within a few years a well-marked case has come under his observation, in which disease of the kidneys was positively excluded. Neither the venous sinuses nor the basilar artery were examined, and the question arises whether the affection may not have been thrombosis of either the basilar artery or the longitudinal sinus.

Thrombosis of the middle meningeal artery may give rise to slowly developed coma, together with hemiplegia; but instances are rare, and they fall, therefore, more properly in the group of paralytic affections.

Somnolence eventuating in complete coma sometimes occurs when, with our present knowledge, these symptoms represent cerebral exhaustion. A striking illustration was a case which the author saw in consultation four years ago. The patient, a man about sixty years of age, after much over-work and mental anxiety, together with deficient alimentation, became greatly prostrated and somnolent. The symptoms of cerebral meningitis were wanting, and renal disease was excluded. He became profoundly comatose, and at the last consultation the Cheyne-Stokes respiration (*vide* page 70) was marked. The interval between the respiratory acts had repeatedly been so long that it was supposed death had taken place. The patient, however, recovered, and is, at the present time, in good health. The author has met with cases of deep somnolence, exciting alarm from its continuance for from twelve to twenty-four hours, the symptoms of inflammation and fever being absent, the patients making no complaint, but wishing to be let alone—that is, not aroused—and recovering under nourishment and stimulants, without any active treatment. These cases seem to exemplify cerebral exhaustion. The diagnosis is to be based on the exclusion of hyperæmia, meningitis, embolism, and uræmia. The affection occurs in persons of advanced age. Anæmia of the brain probably exists, dependent, perhaps, in some cases, on atheroma of the cerebral arteries.

In cases of meningeal hemorrhage, coma is usually sudden, but it may be developed more or less slowly. In hæmatoma of the dura mater, somnolence precedes the coma for a greater or less period as a rule. The diagnosis and treatment of these affections are essentially the same whether the coma be sudden or slow.

Uræmic coma takes place either suddenly or slowly; the latter, as a rule, if not accompanied at the outset with convulsions. Convulsions occur in most of the instances in which somnolence precedes coma. The diagnostic evidence of uræmia and the therapeutical indications have been considered (*vide* page 410).

In the intracranial inflammatory affections which have been considered, namely, acute simple cerebral meningitis and tuberculous meningitis, coma is a very constant and leading feature. The coma may occur suddenly, but it is much oftener developed slowly. This symptom, as occurring in these pathological connections, does not require further consideration. Chronic cerebral meningitis is an affection, the clinical history of which embraces coma, generally developed slowly. Following this affection, epileptic, hysterical, cataleptic, alcoholic, and narcotic coma will severally be considered with reference to diagnosis and treatment.

CHRONIC CEREBRAL MENINGITIS.

By this designation is meant an inflammatory affection corresponding in its essential anatomical characters with acute simple cerebral meningitis, that is, an inflammation at the base or the convexity of the brain, or in both situations, the inflammatory products, lymph or pus, found in greater or less quantity in the subarachnoid space, together with a variable amount of serous effusion in this space or within the ventricles. This definition excludes tuberculous meningitis. The chronic inflammatory affection which exists in the affection known as progressive general paralysis is excluded. This is included in the group of paralytic and ataxic affections. Cerebral sclerosis falls in the same group. The exclusion extends to circumscribed meningitis which is secondary to diseases of the brain or skull. As thus limited, the affection is extremely rare.

The chronic is sometimes a sequel of acute cerebral meningitis. If the latter have been diagnosticated, the diagnosis of the chronic affection is easy. But, in most instances of the chronic affection, the inflammation is subacute from the first. The diagnosis is then often difficult. The difficulty arises from the diversity of symptoms in different cases, and, in some instances, the remarkable absence of symptoms pointing to cerebral disease prior to the occurrence of coma.

In well-marked cases, persistent headache—diffused, not localized—is more or less prominent. It is, in some instances, slight or even wanting. Its diagnostic value is derived wholly from the symptoms with which it is associated, inasmuch as it is prominent in various affections other than meningitis. Dizziness or vertigo is a pretty constant symptom; but this, too, occurring in other affections, and also as a functional disorder, has alone no special diagnostic value. Both are important in the diagnosis when taken in connection with other symptoms. Tinnitus aurium belongs in the same category. The most significant of the local symptoms relate to the mind. Incoherency and delirium, varying in character and degree, occur in some cases. In cases of a milder grade of inflammation, the mental symptoms are apathy, dulness approaching perhaps to imbecility, moroseness of disposition, and irritability of temper. The character of the patient sometimes seems to have undergone a total change. Paralyses affecting the facial nerve, the hypoglossus or the orbital nerves, are apt to occur if the meningitis be basilar. These, with other cerebral symptoms, point to cerebral disease, but they increase the difficulty of differentiating simple meningitis from tumor of the brain.

Other than cerebral symptoms are important in the diagnosis. Vomiting is a symptom of importance. It occurs early, and is more or less prominent. Its prominence in some instances may lead to the error of overlooking the cerebral affection and considering the disease as gastric. The vomiting occurs irrespective of ingesta, and is not accompanied by other local symptoms denoting gastritis. There is more or less increase of the temperature of the body, but the amount of increase is variable, and, during the progress of the disease, the temperature may fall within the normal range or even below it. Absence of fever at the time a patient is examined is not sufficient to exclude chronic meningitis, but fever is probably never absent throughout the course of the disease. Muscular weakness and uncertainty of gait belong to the history of the disease. Generally, patients keep the bed, and present the appearance of a grave disease prior to the occurrence of coma. Rigidity of the muscles of the neck occurs in some cases. Convulsions are rare. Coma preceded by somnolence occurs sooner or later, and this event is usually the precursor of a fatal termination. Coma, however, may occur repeatedly, the patient in the intervals presenting so little evidence of cerebral disease that convalescence might almost be declared. The author has reported a case illustrative of this fact, the autopsy showing the causation of the coma to have been serous effusion into the ventricles.[1]

Chronic cerebral meningitis may be mistaken for typhoid fever. The latter is to be excluded by the absence of its characteristic symptoms—diarrhœa, tympanitis, eruption, etc. The question arises, in some cases, whether the delirium and somnolence be not referable to hysteria? Somnolence and coma sometimes occur when the previous symptoms had not seemed to denote any well-defined or important disease, and the patient, perhaps, had been suspected of either being hypochondriacal or malingering. In all these cases the ophthalmoscope may afford important information by discovering either ischæmia of the optic disk or neuro-retinitis. It is doubtful whether the ophthalmoscopic appearances warrant a discrimination of simple chronic meningitis from tumor of the brain. Tuberculous meningitis can only be excluded by the absence of tubercles in the choroid and of the evidence of tuberculous disease in other situations. Tumor of the brain and abscess are to be excluded by the absence of their diagnostic symptoms. The discrimination from these affections is the diagnostic problem in most cases, assuming that the existence of an important cerebral disease is recognized. The pain is less frequently localized and fixed in the same situation in chronic meningitis; paralyses affecting the cranial nerves, and especially hemiplegia, occur later, and are oftener wanting. Epileptiform convulsions are comparatively infrequent. The mental faculties are affected earlier and in a greater degree.

Treatment of Chronic Cerebral Meningitis.

The rational objects of treatment are the same as in the second stage of the acute affection, namely, to promote the removal by absorption of inflammatory products and support the vital powers. The remedies for the accomplishment of the first of these objects are the same, namely, mercury and the iodide of potassium (*vide* page 492). Of a disease so rare as this, and generally proving fatal, recovery is presumptive evidence of the efficacy of the treatment. A case seen by the author in consultation seemed to exemplify the efficacy of mercury. The patient, a man aged about thirty, returning from New York to Jersey City in the night-time, was knocked down, robbed, and left in a state of unconsciousness. Recovering his consciousness, he was able to reach his home, extremely chilled, the occurrence being in the winter. On examination, there was no appearance of local injury, and the inference was that he was struck by a sand-bag. For several days he was listless and indisposed to exertion, but presenting no decided symptoms of disease, so that the physician who saw him, an able practitioner of large experience, suspected, for a time, that his illness was imaginary. Gradually his intellect became confused, and he took to the bed. Incoherency and delirium followed, with somnolence, disturbance of the rhythm of respiration, and the evidence of lancinating pains referable to the head; the temperature of the body not being increased. This was the condition when he was seen by the author in consultation. He remained in this condition, not recognizing his physician or family, for eight weeks. He was treated with the iodide of potassium, but without improvement, until, at length, calomel in small doses was prescribed. Under the latter remedy he began to improve, and recovered without ptyalism.

---

[1] Principles and Practice of Medicine, 4th edition, p. 634.

Epileptic Coma.

In a paroxysm of epilepsy, coma occurs suddenly, and is immediately or quickly accompanied by convulsions, so that this disease is embraced in the group of convulsive affections. In some cases, after the paroxysm has ceased, coma, more or less complete, remains for a period varying from a few moments to several hours. If the patient be found in the comatose state, the epileptic paroxysm not having been witnessed by any one, the physician may be called upon to decide at once, from what is apparent to his observation, as to the significance of the coma. Of course, if he knows that the patient is subject to epilepsy, this is ground for the presumption that the coma is a sequel of an epileptic paroxysm; but an epileptic may become comatose from cerebral hemorrhage or other causes irrespective of epilepsy. The evidences of convulsions are to be sought after in the presence of frothy saliva, perhaps colored with blood, and wounds inflicted by the teeth upon the tongue or inner surface of the cheek. The absence of hemiplegia is to be noted. The fact of convulsions having been established, uræmia is to be excluded in doubtful cases by an examination of the urine, if this can be obtained. To differentiate epilepsy from uræmia is important with reference to prompt and efficient treatment if the convulsions and coma be due to the latter. The disappearance of the comatose state in most cases renders it practicable to exclude the conditions, other than uræmia, which give rise to coma.

Hysterical Coma.

Among the varied physical and psychical phenomena generally embraced under the name hysteria are paroxysms of apparent unconsciousness. Physicians are not infrequently summoned in haste to patients in this state, which is apt to excite great alarm in the minds of friends and attendants. The coma is very rarely, if ever, complete. Although patients may not seem to be roused by efforts for that end, in most instances at least there is more or less cognizance of what is going on around them. It would be incorrect to say that the apparent mental state is simulated; but it would be fair to call it pseudo-coma, inasmuch as the degree of unconsciousness is not as great as it appears to be. It is desirable, with reference to prognosis and treatment, to discriminate this from other forms of coma. The previous history will always show that the coma was preceded by some of the well-known manifestations of hysteria. Generally, hysterical convulsions and contractures precede and accompany the mental condition. The fact that the patient is known to be hysterical has weight in the diagnosis; but a person subject to hysteria is by no means thereby exempt from the other affections which give rise to coma. The respirations are often paroxysmally hurried, but in the intervals unaffected. Stertor is wanting. The appearance is that of quiet sleep. The pupils respond to light. The pulse is regular. The cold douche applied to the head rarely fails to restore consciousness. Irritation of the skin, *e. g.*, by "firing," or by sinapisms, may have the same effect.

Hysterical coma occurs in such a large proportion of cases in young women, that sex and youth have considerable weight in the diagnosis. Men, however, are not exempt from it. The author has observed some striking instances of apparently almost complete unconsciousness, having the characters of hysterical coma, and lasting for several days.[1]

Hysteria is included in the group of convulsive and of paralytic affections. It will also be considered as one of the neuroses.

Treatment of Hysterical Coma.

For this manifestation or phase of hysteria, the cold douche applied to the head is an efficient measure of treatment. It should be continued until consciousness is restored, and until the patient expresses the belief that if it be discontinued the coma will not return. The importance of the latter point is based on the fact that the efficacy of the measure depends upon its moral effect. In order to avoid its further continuance or its repetition, the patient is incited to an effort of the will sufficient to control this hysterical manifestation. Sinapisms, or the application of a hammer heated in warm water, are also efficient measures of treatment, the modus operandi being the same.

CATALEPTIC COMA.

In catalepsy the coma is in fact hysterical, the distinguishing feature being the remarkable condition of the voluntary muscles. This affection will be considered in connection with the neuroses.

ALCOHOLIC COMA.

Persons comatose from alcohol, in other words, using a vulgar expression, who are "dead drunk," not infrequently come under the cognizance of physicians when the cause of the coma is not known nor even suspected. One of the first cases which, accidentally, came under the author's observation after becoming a candidate for medical practice, was that of a young man who was left at his father's door late at night, in a state of alcoholic coma. It did not occur to his friends that he might be intoxicated, and consequently great alarm was felt. Apprehensions of danger were allayed by the diagnosis which was indiscreetly, perhaps improperly, communicated; and another effect was an indisposition to any further medical counsel from the same source. In another similar case which came under the author's cognizance, an error of diagnosis was followed by unpleasant consequences. The patient was supposed to have a grave cerebral affection. This was at a time when active antiphlogistic treatment was in vogue. The patient was bled, his head shaved, and a blister applied to the scalp. The chagrin of both physician and patient on the recovery of consciousness may be imagined. Serious consequences from attributing to drunkenness coma from other causes, have repeatedly occurred. Persons found in a state of unconsciousness from injury or disease have been arrested, confined in a station-house, and, on a partial return of the mental faculties, have been brought before a magistrate and sentenced summarily to confinement in a penitentiary. Such gross judicial outrages, however, have been committed in the absence of a proper medical examination. Persons found unconscious in the streets are often brought to hospitals with no history, and the diagnostic problem is whether the coma be alcoholic or due to other causes.

---

[1] *Vide* Principles and Practice of Medicine, fourth edition, page 767.

Again, among persons whose profession, position, or sex would seem to preclude a suspicion of drunkenness, instances sometimes occur in which the diagnosis is alcoholic coma. In such cases the physician is always to bear in mind that professional honor requires his secresy; an imperative duty is the protection of the feelings and reputation of his patient. The physician is bound to withhold the communication of this, as well as other disreputable afflictions, of the husband from the wife, and *vice versa*. Young children, led by curiosity, when unobserved, to help themselves to alcoholics which are in their way, are sometimes found to be unconscious, and are supposed to have an attack of some grave disease. The comparative freedom from danger in cases of alcoholic coma renders the diagnosis desirable; but fatal instances occur, and hence the recognition of the affection with reference to treatment is not unimportant. In the diagnosis of drunkenness an important fact is to be borne in mind, namely, a person more or less under the influence of alcohol, may, at the same time, have cerebral hemorrhage, uræmia, or an injury of the skull, to which the coma is in a measure, if not entirely, to be attributed.

Vomiting usually takes place in alcoholic coma. If the vomited matter be observed, it may emit the odor of wine or spirits. The elimination of alcohol by the lungs can almost always be perceived in the breath by the smell. These are diagnostic points. The breathing may be noiseless or stertorous. The face is in some cases pallid, in others more or less congested, and sometimes livid. The pulse is usually frequent, small, and feeble. In deep drunkenness there is complete muscular resolution; the limbs, when raised, fall without resistance. The pupils are dilated, presenting in this respect a contrast to their appearance in narcotism. The temperature of the body is below the normal range. There are complete anæsthesia and analgesia. An instance came under the author's observation of a drunken man lying with his feet close to an open fireplace, and allowing a quantity of live coals which fell upon a foot to remain until the tissues were so much destroyed that amputation was necessary.

In cases which present the diagnostic symptoms of alcoholic coma, the head should be carefully examined for injuries which may not be apparent on a superficial inspection. The absence of hemiplegia should, if possible, be ascertained, as thereby cerebral hemorrhage and embolism of the middle meningeal artery are excluded. In most cases the water-test quickly shows the existence of alcoholism. Pouring cold water upon the head from a little distance generally causes a return of consciousness sufficient for manifestations of the characteristics of drunkenness, with which every one, unfortunately, has abundant opportunities to become familiar.

Treatment of Alcoholic Coma.

The cold douche applied to the head is the most prompt and efficient measure of treatment. It may be continued and repeated according to the circumstances in each case. If this be not resorted to, the preparations of ammonia may be given. The liquor ammonii acetatis, or the spiritus ammoniæ aromaticus are eligible preparations. These are useful in removing the milder effects of over-alcoholic indulgence. Strong coffee antagonizes, to some extent, the effects of alcohol. This and the preparations of ammonia may be given per enema if administered with difficulty per orem. If the patient have not vomited freely, vomiting may be excited by drinking warm water or by an emetic of ipecac. After the contents of the stomach have been removed, water given freely is useful by favoring the elimination of the alcohol in the urine. In most cases there is no risk in letting the intoxicating effects pass off without any active therapeutical measures. There may be symptoms, however, which indicate energetic treatment. The symptoms sometimes denote intense cerebral hyperæmia. Wet cupping, sinapisms, and sometimes venesection, are then indicated. Oftener the danger is from an effect exerted upon the nervous centres which preside over the functions of respiration and the heart's action. When the disturbance of breathing and great feebleness of the pulse threaten immediate danger, it would be proper to remove the gastric contents by means of the stomach pump, if free vomiting have not taken place; to give the carbonate of ammonia in full doses, and, as a last resort, to maintain artificial respiration.

NARCOTIC COMA.

The term narcotic is here understood to apply to the coma produced by the different preparations of opium or its alkaloids. Narcotism from opiates is of rather frequent occurrence. In this country, where the preparations of opium are easily obtained, they are often selected as the method of suicide. They are sometimes used in cases of homicide. In most instances opium poisoning arises from mistakes in the administration of remedies, in the putting up of prescriptions by apothecaries, in prescribing by physicians, and in an accidental over-dose by those addicted to the habitual use of opiates. Thus, under various circumstances, medical practitioners are called upon to diagnosticate narcotic coma. In some cases the fact of an opiate having been taken in a poisonous dose is known, but in other cases the fact is to be inferred from the symptomatology.

Profound narcotism is always preceded by deep somnolence into which the patient relapses whenever rousing efforts are intermitted. A diagnostic feature of the somnolence and subsequent coma is the diminished frequency of the respirations. They may be reduced to four or five per minute. The intervals between the respiratory acts are irregular. The frequency of the pulse is often diminished, but much less than that of the respirations; it is sometimes increased, the pulse becoming small and weak. The pupils are contracted and immovable. The skin is cool, and often perspirable. The face is either pallid or cyanosed. The muscles are completely relaxed, if the coma be complete, and reflex movements cannot be excited. This group of symptoms renders the differentiation from most other varieties of coma generally not a difficult problem. The author has referred already to a case (page 413) in which uræmic coma was attributed to narcotism, the existence of renal disease not being known. In this case, however, the pulse was full and strong, the respirations were not infrequent, the face was flushed, and the coma, which was complete, continued too long before death for a lethal dose of opium.

Treatment of Narcotic Coma.

The first object of treatment, if the opiate have been taken by the mouth, is the thorough removal of the contents of the stomach. If deglutition be not lost, an efficient and promptly acting emetic should be given without delay. The sulphates of copper and zinc are eligible articles. If, however, these be not at hand, no time should be lost, but powdered mustard, a tablespoonful in four or five ounces of warm water, should be given instantly. If the patient be unable to swallow, the stomach pump should be immediately resorted to. Apomorphia, given hypodermically, suggests itself under such circumstances, but its efficient action is not to be relied upon, and it should not take the place of the stomach pump if the latter be available. It is not enough that acts of vomiting are produced, but the stomach should be completely evacuated. In order to render innocuous any of the drug which may remain in the stomach after vomiting, a solution of tannic acid should be given. If not readily swallowed, it may be introduced by means of the stomach tube. If this remedy be not at hand, a strong infusion of tea should be used as a substitute. The efficacy of tannic acid as an antidote consists in the formation of a compound which is very slowly soluble.

The next object of treatment is to antagonize those effects of opium poisoning which are especially fraught with danger, namely, failure of respiration from anæsthesia of the respiratory sense (*besoin de respirer*), and feebleness of the heart's action. The danger to life is not from the coma *per se*, but from these effects. Atropia is indicated for this object, and, for the sake of promptness, it should be administered hypodermically. Bartholow enforces, as an important practical principle, that this remedy should not be given in doses which would cause narcosis. If this be done the danger is increased. The purpose is maintenance of the respiration and the heart's action until the danger from the effects of the opiate on these functions has passed. Not more than $\frac{1}{120}$ of a grain of the sulphate of atropia should be injected, and this dose may be repeated twice after an interval of fifteen minutes. The desired effects of this remedy are "dilatation of the pupil, increased power of the cardiac movements, deeper respiration, warmth and dryness of the skin, and flushing of the face."[1] A strong infusion of coffee, or cafeine, administered by either the mouth or rectum, antagonizes, in a measure, the effects of opium. Alcoholics are indicated in order to sustain the action of the heart. An essential part of the treatment, if the patient can be roused, is to maintain wakefulness. Various means may be used for this end, such as the cold douche, slapping the face with a towel wet with cold water, the electrical current, and flagellation. The best plan is what is called the "ambulatory treatment," namely, the patient made to walk constantly between two assistants until the tendency to fall into a dangerous condition of coma ceases.

When coma is complete, that is, the patient cannot be roused, respiration should be kept up by mechanical means, or by the faradic current transmitted to the costal muscles, and to the diaphragm through the phrenic nerve. Repeated instances have occurred in which life has been maintained by these means for many hours until, by elimination, the opiate in the system is reduced to within the limits of tolerance, and the patient saved when death would have been inevitable had these means not been persisted in.

The following illustrative case is of special interest from the fact that the reporter, an eminent physician, recounts his personal experience. It is instructive as regards the employment of atropia to antagonize the effects of opium, exemplifying the practical principle quoted from Bartholow. The case was reported in the *New York Medical Journal*, August, 1874, by Dr. I. D. Trask, of Astoria, L. I.:—

On the morning of March 25th, on sitting down to breakfast at eight o'clock, I took, from a bottle of the size and general appearance of a one-ounce quinine-bottle, a powder which I believed to be sulphate of quinine. It was removed from the bottle upon the end of a breakfast-knife, the quantity estimated to be some six or seven grains, my only anxiety being to take a sufficiently large dose. It was stirred up in a little cold water, and at once swallowed upon an empty stomach. To a young lady visiting in the family, I also gave what I estimated to be three grains; and to my daughter, full grown, I gave somewhat less than two grains: both these had half finished breakfast.

Almost immediately after swallowing the dose, I became conscious of a certain amount of stimulating influence upon the brain, a sensation not unlike the early physiological effects of quinine, and remarked that I had never known quinine to act so promptly upon my system before; recalling to mind instances in which small doses were reported as having acted almost immediately upon patients. At the same time I became conscious of a peculiar sensation about the fauces, an idiosyncrasy which I have all my life observed as following the slightest application of morphine to the lips. Strange as it may seem, both these circumstances were disregarded, and, more than that, the young lady to whom I had given the larger dose read "Sulphate of Morphine" upon the label of the bottle from which the powder was being taken, without realizing its import. I ate very little breakfast. Occupied by morning duties, little notice was taken of the head-symptoms, of which I was all the time conscious, until my daughter remarked that she was suffering from nausea, as she always did after taking morphine. On accidentally overhearing this, and hastening to the breakfast-room, I read, to my dismay, upon the bottle, "Sulphate of Morphine."

---

[1] *Vide* Treatise on Materia Medica, by Roberts Bartholow, 1876, page 346.

By reference to the watch, I found just three-quarters of an hour had elapsed since the dose was swallowed. Realizing the gravity of the accident, I set about making such preparations as I knew to be necessary for the struggle for life that was to follow. From a scruple to a half-drachm of sulphate of zinc was immediately swallowed in solution, which very promptly produced a degree of nausea, but no vomiting. In a few minutes the dose was repeated with absolutely no effect. By this time the influence of the morphine had stolen over the whole system, and was felt especially in the lower extremities. I had sent for my friend Dr. Taylor, but, before his arrival, had injected into the arm thirty drops of a solution of atropine, of one grain to the ounce of water. The antagonistic influence of the atropia was almost instantaneously perceptible. The effects upon the brain and nervous system were so marked, that I could not refrain from expressing to my family my admiration of the action of the remedy. But, alas! this was of short duration. Probably within two or three minutes the morphine got the mastery, and I immediately injected thirty drops more of the atropia. The absorption was now going on rapidly. Dr. Taylor had by this time arrived, and, having injected another dose of atropia, urged the trial of mustard and water. A large quantity of this and of clear warm water was swallowed, and there was a very copious return of the emetic without a particle of food. The impression conveyed to me was that only the upper portion of the stomach contracted, and that the nerves of the lower portion, into which the morphine had been directly received, were paralyzed by its local action. Such partial action of the stomach, the emetic alone returning, is not uncommon, as we all know, when vomiting is sought to be excited for the removal of ingesta. No perceptible effect followed the later injections of atropia.

At my request, Dr. Taylor wrote for a fresh solution of atropine of two grains to the ounce, and we weighed out a portion from the morphine bottle, which I judged to be about equal to the quantity taken, and found it to be fully six grains.

That the electro-magnetic machine might be in readiness when it should be required, I had it brought out. Fortunately it had been recently put in order, but the action of one cell was feeble. A second cell that was accidentally in my possession was brought to me, but much embarrassment was experienced in coupling them. It was almost impossible to keep the attention fixed, though stimulated by the apprehension that others might not understand the mode of connection of this particular instrument, and that a failure might be fatal to myself. It appears, however, that the necessary connections were correctly made. With the help of others, I now hunted up the case of morphine-poisoning described in the March number of the *New York Medical Journal*, with the idea that the mode of application of the electric current there adopted might furnish to those having the case in hand some useful suggestions. The last recollections are of returning to the instrument, under the impression that it was not acting, though it was in perfect operation, and, with a feeling of despondency and indifference, soon abandoning it. After a few walks about the first floor of the house, the inferior extremities doubling under at every step, and within a few minutes of leaving the instrument, absolute unconsciousness supervened. This occurred, as nearly as can be fixed, at ten o'clock. It is interesting to note here, how, under a vigorous exercise of the will in one direction, notwithstanding a most urgent desire to succumb to sleep, a quite efficient control of the intellectual faculties was retained to the very verge of complete unconsciousness.

On the supervention of unconsciousness, Dr. Taylor sent to the city for assistance, having made a subcutaneous injection of thirty minims of the two-grain solution of atropia. He also caused the free administration of brandy and of strong coffee, and I was kept walking, supported by relays of assistants, until all power of motion was gone, and this occurred about eleven o'clock. A short time before this, however, spontaneous vomiting occurred while standing erect, to a most profuse degree, directly after which Dr. Taylor injected thirty minims more of the two-grain solution.

At 11.45, Dr. A. A. Smith, of No. 38 East Twenty-ninth Street, New York, arrived, in the temporary absence of Dr. Taylor, and, on seeing the gravity of the case, sent at once for additional counsel. To Dr. Smith's experience and skill in the use of the electric current, I feel that the successful result is in no small degree due. Dr. Smith has kindly furnished the following notes of the case as observed by him during the time of his stay:—

"I saw Dr. Trask at 11.45 A. M. He was profoundly comatose; all efforts to arouse him did not avail. The skin was moist, the pulse 124, feeble, and somewhat irregular; muscular power was completely gone; pupils moderately dilated (which I knew was due to the sulphate of atropia administered); respirations 13, and irregular. I was at once struck with the character of the respirations. The inspirations were scarcely perceptible, the expirations very long and given with a groan—certainly suggestive. The countenance was of a leaden hue.

"I asked for and obtained a battery (Kidder's make, two-celled faradic current). The battery worked admirably. I applied the poles to the phrenics, one to each, just above the clavicles, at first with a weak current, gradually increasing it until it caused him to take a deep, spasmodic inspiration. I found that the strength required was such as gave me great pain when I held the sponges in my own hands. This was continued for about twenty minutes, when I began to stimulate him, giving teaspoonful doses, of equal parts, of brandy and water. The first spoonful he was unable to swallow. The battery was continued, also irritating the hands and feet, which soon caused some movements more than reflex.

"Within half an hour the pulse became less rapid and stronger, the countenance assumed less of the leaden hue. More brandy was offered, which produced a reflex action, and caused him to cough and inspire deeply afterward. He swallowed some of the brandy, and, after this, brandy and water was given about every fifteen minutes, and the reflex action produced by the attempts at swallowing aided in the great indication of oxygenation of the blood.

"Dr. Taylor returned at about 12.15 P. M., and we agreed upon our line of treatment, viz., to keep up the influence of atropine, taking the pupils as our only guide, keeping them moderately dilated, stimulation, and the battery, not allowing the body to remain in one position more than fifteen or twenty minutes at a time; in this way guarding against pulmonary congestion and subsequent pneumonia. At 12.30 P. M., respiration was 14, perfectly comatose.

"At 2 P. M., Dr. Austin Flint saw him. The pulse was then 108, respiration 18; muscular movement was returning, and by great effort he was aroused and seemed to recognize Dr. Flint; previous to this the eyes had been two or three times opened, and he made efforts to talk. One pole of the battery was applied to the phrenic in the neck, and the other to the diaphragm, but this did not cause the spasmodic inspirations so well as when one pole was applied to each phrenic in the neck. We irritated the muscles by applying the poles to other parts of the body, as one to the brachial plexus, and the other to the forearm or hand, to the chest, abdomen, etc. The feet and hands were constantly irritated. I left the doctor at 4.10 P. M., and by great effort succeeded in getting him to shake hands on parting.

"In two cases in which I have had the opportunity of observing the antidotal effects of sulphate of atropia in opium-poisoning, I was led to conclude that from the one thirty-second to one twenty-fourth grain of atropia counteracted the effects of a grain of morphine."

About the time of Dr. Smith's departure, active delirium began to manifest itself whenever aroused from stupor, the brain being occupied with the idea of driving horses, etc., this excitement being soon followed by a relapse into stupor. This was repeated as often as the patient was aroused, and continued unabated until about 6 P. M., gradually subsiding to about 8 P. M., when this delirium disappeared. During this period, from 4 to 8 P. M., I have distinct recollections of being highly incensed at the means taken to prevent sleep; the act of swallowing was also very difficult and irksome. I was distressed, during these brief periods of consciousness, by the impression that I had become insane, and that the watchfulness of friends was due to this. As the delirium subsided there was constant picking at objects seen in the air or lying around. From 7 to 10 P. M., almost continuous efforts of friends were required to keep me awake, notwithstanding there was a decided desire to engage in conversation. By 12 P. M., I was able to relate to a medical friend quite a lengthy medical case without once losing the thread of the story. Directly after this I was allowed to go to bed. Sleep was much broken, the intellect wandering. During the following day the distinctive symptoms of atropia-poisoning were very marked. There was a degree of indistinctness of vision, a heaviness of the eyelids that rendered it difficult to keep them open, and visions of beautiful scenery and brilliant colors, with grave and fantastic figures of human beings, immediately upon the eyelids being closed. There was also a continued sense of weariness, as well as a very disagreeable viscidity of the fauces that rendered swallowing irksome. All these symptoms disappeared suddenly after a refreshing sleep in the evening. I feel certain that all the symptoms due to the morphine disappeared by 12 o'clock, or sixteen hours after the morphine was swallowed, and that the influence of the atropia upon the cerebrum lasted at least about eighteen hours longer. There was a copious alvine dejection on the following day, and also very free diuresis on the evening of the accident, and during at least twenty hours after the atropic symptoms above described had passed away, both due unquestionably to the atropia. Subsequently there was extreme torpor of the bowels. A very marked prostration of the nervous system followed this accident. For two or three days the digestive system participated to a degree, rendering care necessary in the selection of food, and the frequency with which it was taken. The appetite soon became excellent, and abundant nourishment and stimulus were taken with very little increase in general strength. The nerves of animal life seemed to have suffered a violent shock, from which they were slow to rally. At the end of two and a half weeks, there having been but little gain, a sea-trip was advised, and a two weeks' absence in cheerful travel perfected convalescence.

This case is interesting as one of recovery from a dose of morphine abundantly sufficient to destroy life, and there can be no doubt that the agents employed determined the favorable result. The morphine had been taken suspended in water, of which also a sufficient amount was immediately afterward taken to secure solution in the stomach—the stomach, moreover, being empty; and but a very small quantity of food was afterward swallowed. The morphine lay undisturbed in the stomach certainly until after the mustard-emetic took effect, a period of at least an hour and a quarter, and it is questionable if any of the morphine was ejected even by the action of the emetic. It is certain that a sufficient amount of morphine was absorbed to induce a very dangerous degree of narcotism.

The antagonistic influence of atropia was here very plainly proved. The recognized influence of the first dose in clearing up the mental faculties has already been referred to; and, though this was almost immediately overcome by the advancing narcotism, there can be no question that, through it and subsequent doses, the system throughout the narcotism was under the influence of the atropia also. This was shown by the dilated condition of the pupil throughout the day, and the early supervention of delirium. The atropia must, therefore, have been somewhat in excess of the morphia. Moreover, the symptoms of atropia-poisoning survived those of morphine by about eighteen hours; but this might have been simply due to the longer duration of the action of atropia on the human system. The duration of the more profound stage of narcotism was also much less than if the morphine had been left to its undisputed influence on the system. I think it must be a very unusual circumstance for the coma, etc., to subside so soon. This case thus affords additional confirmation of the antagonistic influence of these two agents; and, that such confirmation is even yet needed by the profession, is shown by the skepticism that still prevails with many on this point; men eminent in the profession having, since this occurrence, assured me that they had hitherto had no confidence in such antidotal effects.

IV.

PARALYTIC DISEASES.

INTRACRANIAL DISEASES OR CEREBRAL PARALYSES. INTRASPINAL DISEASES OR SPINAL PARALYSES; CEREBRO-SPINAL PARALYSES. PERIPHERAL PARALYSES. MYOPATHIC PARALYSES.

INTRACRANIAL DISEASES OR CEREBRAL PARALYSES.

GENERAL CEREBRAL PARALYSIS. CEREBRAL HEMIPLEGIA. HEMIPLEGIA FROM CEREBRAL HEMORRHAGE. HEMIPLEGIA FROM EMBOLISM AND THROMBOSIS. HEMIPLEGIA FROM, AND THE DIAGNOSIS OF, INTRACRANIAL TUMORS. HEMIPLEGIA FROM, AND THE DIAGNOSIS OF, CEREBRAL ABSCESS. FUNCTIONAL HEMIPLEGIA.

PARALYSIS from intracranial diseases is either local, partial, or general. When local, the power of transmitting volition through one or more of the cranial nerves is either impaired or lost (complete or incomplete paralysis). If partial, the paralysis affects a lateral half of the body, that is, it involves the upper and the lower limb on one side, together with, generally, the muscles of the face (hemiplegia). If general, it extends to the extremities on both sides of the body and to the head (general cerebral paralysis). The paralysis when partial or general, as well as local, may be complete, or it may present the different grades of incompleteness. The following are intracranial diseases to be considered in this subdivision: Diffused chronic interstitial encephalitis (cerebral general paralysis), cerebral hemorrhage, softening from thrombosis and embolism, tumors of the brain, and cerebral abscess. Added to these are paralysis affecting the cranial nerves, glosso-labial or bulbar paralysis, and functional hemiplegia. These diseases will be considered from the three varieties of paralysis as standpoints, that is, as giving rise to general paralysis, hemiplegia, and local paralyses. Thus arranged, general cerebral paralysis will be the heading for diffused chronic interstitial cerebritis. Cerebral hemorrhage, softening, tumors, abscess are considered in connection with hemiplegia, which is also sometimes functional. Local paralyses dependent on intracranial diseases are limited to the cranial nerves. Paralysis affecting these nerves may either depend on a disease of the brain, or upon some cause acting upon the nerves at a situation more or less removed from their cerebral connections; in the former case, the paralysis is centric; in the latter, peripheral.

GENERAL CEREBRAL PARALYSIS. DIFFUSED CHRONIC INTERSTITIAL CEREBRITIS.

This affection was formerly called the paralysis of the insane. It was considered as a variety of mental derangement, and treated of chiefly by writers on insanity. Its anatomical features have been much studied of late years, and its pathological character seems to have been determined. It is a diffused, interstitial, chronic inflammation of the encephalon. It is analogous to the sclerotic or cirrhotic affections seated in other organs, namely, the kidney, liver, etc. It has been called progressive general paralysis. Jaccoud describes it under the name *diffuse, interstitial, periencephalitis*, and suggests, as a better term, *diffused, interstitial encephalitis.* The latter name is here adopted. German writers call it *dementia paralytica.* In most cases the interstitial inflammation extends to the spinal cord. Since, however, the encephalon is primarily and predominantly affected, it is properly included among the intracranial diseases, being in these respects the converse of multiple sclerosis, which will be considered among the spinal diseases.

The clinical history presents the following order of events: *First*, certain changes in mental disposition, ideas, and character, which are liable to be regarded only in the light of eccentricities, and not as denoting the commencement of a grave pathological condition. These are generally described as belonging to a prodromic period, but they are the primary symptoms of the disease. *Second.* Distinct evidences of mental derangement or insanity, conjoined with disordered motility. *Third.* Dementia and general motor paralysis. The disease may be divided, according to this order, into three stages. In the first or initial stage, there is, in most cases, an unusual activity of mind. The appearance, language, and actions show an abnormal mental excitement. There are extravagances of conduct which are at variance with previous habits. A prudent man may become lavish in expenditures beyond his means and position; projects are entered into which are utterly inconsistent with previous sagacity or good sense; violations of decorum and delicacy are committed which excite surprise from their incongruity with the past life. The moral sense may be perverted; a man hitherto actuated by honorable and religious sentiments, is guilty of theft or other acts of dishonesty. One who has been modest and chaste may manifest libidinous propensities which are apt to be associated with impotence. The importance of these facts in connection with medical jurisprudence is obvious. Responsibility, moral and legal, is, of course, made void by establishing the dependence of these psychical aberrations on encephalic disease; but it must be confessed the diagnosis cannot be reached with certainty in this stage. Irritability and violence of temper, these traits of character being unnatural, sometimes characterize the initial stage. Exceptionally, the mental change is, from the first, the opposite to that represented. The patient is depressed, taciturn, hypochondriacal. These symptoms, as well as those which are more frequent, are indicative of weakness of the faculties of the mind, thus foreshadowing imbecility. The duration of the first stage varies from many weeks to many months. With reference to an early diagnosis the age of the patient is of importance. The disease is one of middle life. It occurs in men much oftener than in women. As a rule, vigorous, rather than feeble, persons are affected. Exclusive of these facts there is nothing in the etiology, as yet known, having any special diagnostic import.

During the second stage the diagnosis is easily made. The psychical changes eventuate in insanity. The prevailing delusions are generally, not invariably, characterized by supreme self-satisfaction. Patients fancy they are enormously rich, that they are loaded with honors, that they are distinguished personages, that they are gifted with extraordinary personal attractions, etc. The French phrase *délire des grandeurs*, expresses happily the characteristic features. Similar delusions characterize cases of monomania, but there is this essential difference: monomaniacs hold fast to their delusions, and persistently act in accordance therewith; whereas in the disease under consideration the delusions are without stability, the patient passing from one to another. In this, dementia is manifested; while the monomaniac, in connection with a fixed insane delusion, may show much ingenuity and strength of ratiocination. In some cases the insanity is of an opposite character. The delusions are of a depressing nature. Patients imagine they are about to die, or that death has actually taken place.

Disorders of motility accompany, and they may precede, the foregoing symptoms. Trembling of the muscles of the face and of the tongue, when protruded, is a noticeable symptom not infrequently in the first stage. Inability to write or to perform other acts with the fingers and hands which require nicety in the combination of movements; hesitation and stammering in speech from difficulty in combining the movements involved in articulation; a straddling, irregular, and uncertain gait in walking, the equilibrium of the body maintained with effort—these are symptoms more or less marked prior to much diminution of muscular power; and they denote, therefore, motor ataxia rather than paralysis. They are precursors to general paralysis.

During the progress of the disease apoplectiform and epileptiform attacks, not only once but repeatedly, are not uncommon. Paroxysms of furious delirium sometimes occur. These intercurrent events are accompanied with a considerable elevation of the temperature of the body. During the progress of the disease, marked remissions, as regards either the mental or the paralytic condition, sometimes takes place, giving rise to a delusive appearance of real improvement.

Much importance has been attached to an inequality in the size of the pupils. It is a noteworthy symptom occurring in the first as well as in the second stage. The proportion of cases, however, in which it is wanting, is not inconsiderable. The ophthalmoscope, in a certain proportion of cases, shows nothing abnormal; but in the majority of cases, according to Allbutt and Noyes, hyperæmia is followed by atrophy of the optic disk. Cutaneous anæsthesia is sometimes marked; hyperæsthesia is rare.

Although different cases offer much diversity in the symptoms, yet, the character of the latter, and the order of succession, are so distinctive as to render the discrimination of the disease sufficiently easy. The diagnostic characters of disseminated or multiple sclerosis of the spinal cord, will be found to distinguish clearly that affection. It is noteworthy that when the symptoms show an advanced period in the progress of general cerebral paralysis, appetite, digestion, and nutrition may be well maintained, vegetative life showing little or no deterioration.

The third stage is distinguished by true general paralysis, which is progressive, and approximates finally to completeness. The dementia is complete. Confined to the bed, patients pass the urine and feces purely in obedience to instinct. The characters of intellectual life are lost, but vegetative life may still continue for an indefinite period.

The duration of the disease is extremely variable, the minimum and maximum being respectively three months and fifteen years. As regards a fatal termination sooner or later, the prognosis is as unfavorable as possible. Death is sometimes due to the supervention of acute encephalic inflammation. It may be caused, in different cases, by various intercurrent affections. When the duration is greatly prolonged, the disease may end by gradual asthenia; the ending, perhaps, hastened by ulcers or gangrene of parts exposed to long-continued pressure from the decubitus. Sudden death has repeatedly resulted from the inhalation of an alimentary bolus into the windpipe.

A few words suffice for the consideration of the treatment. The disease furnishes no special indications. In the first stage, the patient should be exposed as little as possible to external causes of irritation or excitement. When insanity and general paralysis become developed, the treatment consists in proper care and in following symptomatic indications.

Paralysis of the four limbs, and involving more or less the muscles of the face, may be a result of successive attacks of hemiplegia. If the case have been under observation from the date of the first hemiplegic attack, or if the previous history be known, the general paralysis, as thus produced, is diagnosticated without difficulty. A considerable hemorrhage into the pons Varolii, involving this part on each side of the median line, causes a general paralysis, and proves rapidly fatal.

Cerebral Hemiplegia.

Hemiplegia, save in extremely rare instances, is symptomatic of a cerebral affection. An unilateral paralysis of the limbs may be a symptom of disease limited to a lateral half of the spinal cord. This is to be distinguished as spinal hemiplegia. In the latter, the muscles of the face are not affected, whereas they are rarely unaffected in cerebral hemiplegia. This is a point involved in the differential diagnosis. Other points are the coexistence of symptoms referable to the head in cerebral, and the absence of these, together with the presence of symptoms referable to the spine, in cases of spinal hemiplegia. Cerebral hemiplegia implies an affection seated in the hemisphere of the brain opposite to the paralyzed side, and above the decussation of the motor (kinesodic) and also of the sensory (æsthesodic) fibres. The paralysis of the facial muscles is usually on the same side as the paralyzed limbs. Occasionally, the facial muscles which are paralyzed are on the opposite side. This variety is known as crossed paralysis or alternate hemiplegia. As a rule, the facial muscles which are chiefly paralyzed are the buccinator and those attached to the angles of the mouth. The orbicular muscle is but slightly paralyzed; the patient is able to close the eye, but generally not to the same extent as on the opposite side. The genio-hypoglossus muscle on the side opposite to the cerebral affection is, in most cases, paralyzed; the point of the tongue, when protruded, being thereby deflected toward the paralyzed side. In the majority of cases, the muscles to which other cranial nerves are distributed, and the special nerves, are unaffected; but, exceptionally, either vision, smell, or taste is affected, and certain of the orbital muscles. The cutaneous sensibility to pain and touch on the hemiplegic side is either not impaired, or, if otherwise, only for a short time after the occurrence of the hemiplegia. In rare instances, however, the paralysis is both sensory and motor. The former has been known to persist after the disappearance of the latter. These several variations from the typical form of hemiplegia will be referred to presently in connection with the localization of the cerebral affection of which the hemiplegia is symptomatic. The hemiplegic paralysis affects simultaneously, or nearly so, the upper and the lower limb. This is the rule, with some exceptions, in which either the upper or the lower limb remains paralyzed, for a greater or less period, before the other. Another rule is that, if both limbs be not completely paralyzed, the degree of paralysis is greater in the upper than in the lower limb; and recovery or improvement is earlier and more rapid in the lower limb. To this rule there are occasional exceptions.

Hemiplegia is incidental, in some cases, to cerebral affections which have been considered, namely, acute and chronic cerebral meningitis, meningeal hemorrhage, cerebral pachymeningitis, and, perhaps, simple congestion of the brain. It is a constant symptom of cerebral hemorrhage, embolism, and thrombosis. These latter affections have been already considered as giving rise to coma; they are the most frequent of the affections which give rise to hemiplegic paralysis, and, therefore, they claim consideration in this connection. In cases of hemiplegia, the diagnosis involves the discrimination of these affections from each other, and from affections not as yet considered, namely, tumors of the brain, abscess, and certain functional conditions. Cerebral hemorrhage, existing in the larger proportion of cases, may be taken as the standard for comparison.

Hemiplegia from Cerebral Hemorrhage.

In the great majority of cases the hemiplegia is coincident with an apoplectic seizure. It is a diagnostic point that hemiplegia from hemorrhage, less frequently than from other affections, occurs without coma at the outset. When coma is wanting, the attack is sudden; the patient has what is called a "stroke of palsy." In cases commencing with apoplexy, the apoplectic condition disappearing, and hemiplegia remaining, the diagnosis is to be based on the points which distinguish sudden coma from cerebral hemorrhage (*vide* page 499). Cases of hemorrhagic hemiplegia not accompanied at the outset by apoplexy, are less easily diagnosticated. The absence of the cerebral symptoms of tumor and abscess, prior to the occurrence of the hemiplegia, excludes those affections. The circumstances connected with the occurrence of the paralysis and its duration, show that it is not purely functional. The differential diagnosis, therefore, lies chiefly between cerebral hemorrhage and either embolism or thrombosis. Diagnostic points which distinguish hemorrhage are, the age of the patient, forty years or more; the persistence of the paralysis, with slowness of improvement, if any takes place, and absence of complete recovery. Hemiplegia, either with or without coma, if sudden, is generally due to hemorrhage when it occurs in connection with renal disease. Absence of cardiac lesions and aortic aneurism is of importance in the exclusion of embolism. The age, it is to be remarked, although of considerable weight against embolism, is of none whatever against thrombosis. It is to be added, that persistency of the paralysis, slowness of improvement, and absence of complete recovery, are by no means inconsistent with either thrombosis or embolism. A fair conclusion from this brief account of the differential diagnosis is, that it had better not be made with positiveness if the practitioner be sensitive in regard to accuracy as a diagnostician.

A more comprehensive diagnosis than the fact of hemorrhage embraces its localization. In a typical case the extravasation is usually in or near the corpus striatum. Its occurrence in other situations may be inferred from conditions which have been mentioned. Alternate hemiplegia, that is, paralysis of the face on the side of the lesion, the paralysis of the limbs being on the opposite side, implies a lesion of the pons Varolii (annular protuberance) situated at its lower portion. If the seat be in the upper and anterior lateral portion of the pons, the facial paralysis corresponds to the paralysis of the limbs; it is on the side opposite to that of the lesion. The facial paralysis is more marked than when the hemorrhage is in the corpus striatum; the orbicularis palpebrarum and the muscles of the forehead, which either are unaffected or affected but slightly in typical cases of hemiplegia, are paralyzed as in cases of peripheral paralysis of the facial nerve. The abducens muscle is often paralyzed, causing internal strabismus. In some cases of hemiplegia the facial muscles and the limbs paralyzed on the same side, the muscles which receive branches of the third nerve, are involved, as shown by ptosis, dilatation of the pupil, and deviation of the eyeball outward. These involved muscles are on the side opposite to the paralyzed face and limbs—that is, on the side of the cerebral lesion. The latter is then seated in the crus cerebri. This is a rare form of "alternate hemiplegia." Paralysis affecting the sensory and motor branches of the fifth nerve, giving rise to anæsthesia of one side of the face, and weakness of the muscles of mastication, together with impairment of smell and taste; also, paralysis involving the glosso-pharyngeal nerve, and in an unusual degree the hypoglossal nerve, point to an affection of the pons Varolii. The author has recently met with a case of hemorrhagic hemiplegia, in which the power of deglutition was so completely lost that it was necessary to nourish the patient for some time by means of the stomach tube and rectal alimentation. After a time the ability to swallow was regained. The persistence of hemi-anæsthesia in some rare instances seems to warrant the localization of "a considerable lesion just outside the optic thalamus, involving the peduncular expansion (internal capsule) just at the point where it begins to unfold into the foot of the radiating crown of

Reil."[1] A greater degree of paralysis of the lower than of the upper limb, which is a rare exception to the rule, according to Bastian, is "most frequently associated with certain unilateral lesions of the pons Varolii, or with pressure upon this part produced by lesions of the cerebellum." Hæmorrhagic hemiplegia very rarely involves loss or notable impairment of the sense of sight or of hearing. It is otherwise in cases of hemiplegia from tumor or abscess of the brain.

A diagnostic feature of cerebral hemiplegia is the preservation, and sometimes an increase, of the electro-excitability of the paralyzed muscles. Another feature is the long period before notable wasting of the muscles takes place.

Treatment of Hemiplegia from Cerebral Hemorrhage.

In the treatment of all paralytic affections, the first point to be considered is the causative pathological condition. In this affection the paralysis is symptomatic of a clot on the brain substance. Practically, the clot is a foreign body. It involves more or less disruption of cerebral structure. Complete recovery from the paralysis is therefore not to be expected. As close an approximation thereto as is compatible with the permanent damage which the brain substance has sustained, is the end to be desired. If the damage be small, the restoration may be nearly complete. The progress toward restoration depends on the absorption of the clot. The absorption takes place slowly. When completed, an "apoplectic cyst" may remain and persist indefinitely, or the result may be an "apoplectic cicatrix."

Rationally, it is an object of treatment to hasten the absorption of the clot. The remedies formerly in vogue for this object, mercury, iodine, etc., are not now employed. There is no ground for supposing that they contribute to the object, and their effects upon the digestive organs and the general system are hurtful. Counter-irritation is of no service. In short, there are no known direct means for effecting this object. Indirectly, the absorption of the clot is promoted by measures which conduce to improvement of the general condition of the patient, namely, a nutritious diet, tonic remedies, gestation or gentle exercise in the open air, change of scene, and cheerful mental influences. These measures constitute an important part of the treatment.

The general objects of treatment directed to the paralyzed parts have been already stated (*vide* page 482). Electrization, strychnia or nux vomica should not be employed until after some months from the date of the attack. The transmission of the electric current to the brain is not considered judicious by those most competent to judge.

The liability to a recurrence of cerebral hemorrhage is the same whether the hemiplegia be, or be not, accompanied at the outset with coma, and the duty of the practitioner with reference thereto the same. (*Vide* page 507.)

---

[1] *Vide* Paralysis from Brain Disease, by H. Charlton Bastian, Am. ed. 1875, page 142. Also, Nothnagel in Ziemssen's Cyclopædia.

HEMIPLEGIA FROM EMBOLISM AND THROMBOSIS.

Hemiplegia from occlusion of cerebral vessels may occur either without or with coma at the outset. The latter is wanting oftener than in cases of cerebral hemorrhage; and it is much more infrequent in cases of thrombosis than of embolism. The paralysis may disappear after a few days, hours, or minutes. No structural change, in these cases, follows the occlusion of the vessels, and the paralytical affection may be properly reckoned as functional. If the paralysis continue for several days, softening, from arrest of nutrition of the brain substance within the area of the branches of the occluded vessel, takes place (encephalomalacia). The hemiplegia is then symptomatic of the brain lesion.

An embolus and a thrombus give rise to hemiplegia without having been preceded by symptoms which denote antecedent disease. This fact excludes tumor and abscess. The diagnostic problem is, first, the exclusion of cerebral hemorrhage; and, second, the differentiation of thrombosis and embolism. The points which distinguish embolism from hemorrhage, as regards hemiplegia, are the same as in cases of embolic and hemorrhagic apoplexy. In each, the attack, as a rule, is sudden. Youth, the existence of valvular lesions of the heart, or of aortic aneurism, the paralysis right-sided with aphasia, point to embolism; *per contra*, the age above forty years, absence of cardiac lesions, and the paralysis left-sided, warrant a presumption of hemorrhage. These differential points authorize a highly probable, but not a positive, diagnosis. The revelations of the dead-house, in a large hospital, exemplify the liability to confound the two affections. Hemiplegia from thrombosis is rarely accompanied by coma at the outset. The paralysis, as a rule, is not sudden; it is not a "stroke of palsy," but hours, and even days, may be occupied in its development. It occurs in middle and advanced life. The calcareous degeneration of arteries which can be felt, and notable feebleness of the circulation, are points in evidence. The paralysis from thrombosis may be preceded by certain cerebral symptoms, dizziness, mental confusion, disposition to sleep, etc., denoting ischæmia, caused by degenerative disease of the arteries of the brain. These points render it easier to differentiate thrombosis from both embolism and hemorrhage, than to discriminate from each other the two former of these conditions.

Uncertainty as regards the differential diagnosis in cases of hemiplegia from hemorrhage, embolism, and thrombosis, sometimes arises from the fact that these different pathological conditions may occur in combination. Paralysis from hemorrhage may be increased by inflammatory softening around the clot. An embolus leads to thrombosis at the site of the obstruction, rendering the occlusion more complete.

Treatment of Hemiplegia from Embolism and Thrombosis.

The rational object of treatment is promotion of the re-establishment of the circulation in the portion of brain deprived of its quantum of oxygenated blood by the arterial obstruction, in order to prevent or limit softening and necrobiosis. This object pertains alike to thrombosis and embolism, the rationale of the paralysis being the same in each. Everything which tends to impoverish the blood or weaken the circulation is in conflict with this object. The subordinate ends are the fullest possible assimilation, and strength of the heart's action. A nutritious alimentation, tonic remedies to improve appetite and digestion, chalybeates, phosphorus, digitalis, and nux vomica as cardiac stimulants, together with alcoholics, are to be directed according to the indications in individual cases. Bastian suggests the inhalation of the nitrite of amyl, with proper care, at short intervals, with a view to the dilatation of the collateral vessels. Measures addressed directly to the paralyzed muscles are indicated as in other paralytical affections. Electrization may be resorted to earlier, and with less reserve than in hemiplegia from cerebral hemorrhage.

HEMIPLEGIA FROM, AND THE DIAGNOSIS OF, INTRACRANIAL TUMORS.

Intracranial tumors frequently, but not constantly, give rise to hemiplegia. Occurring in this pathological connection, it is to be distinguished from its occurrence in other symptomatic relations. Tumors not infrequently occasion paralysis of one or more of the cranial nerves without giving rise to hemiplegia ; and, in some cases, they stand in a causative relation to apoplectic coma and convulsions. The diagnosis, therefore, is not limited to cases of hemiplegia ; but, in view of the frequency of the latter as a symptom, it is appropriate to consider their diagnostic symptoms under this heading. In general terms, the diagnosis of hemiplegia from tumor of the brain is based on the evidence of the latter as preceding and accompanying the hemiplegic paralysis. The question, then, is, what symptoms, either with or without hemiplegia, are diagnostic of tumor of the brain ? The requirements of diagnosis are not fully satisfied by the answer to this question. Intracranial tumors differ in character and in situation. Having diagnosticated tumor in any case, these questions arise: What is the kind of tumor ? and where is its seat ? These questions may be considered under this heading.

The initial symptoms are indefinite. Certain of these relate to the mind. Patients are irritable, depressed, listless, and the memory fails. In a considerable proportion of cases, headache is more or less prominent. Other symptoms are vertigo, vomiting, epileptoid attacks, tinnitus aurium, and impairment of vision. These symptoms do not always accompany intracranial tumors ; for they are sometimes found after death when there had been no symptoms pointing to cerebral disease. More definite symptoms occur after a variable period, extending, perhaps, over many months ; its duration depending on the rapid or the slow growth of the tumor, its pathological character, and its seat. Cephalalgia often becomes more marked. Its intensity is sometimes great ; this being usually in proportion as the tumor approaches the meninges. The pain may be diffused or localized, oftener the latter. The localization may correspond to the situation of the tumor ; but this is not invariable. Depression of spirits may amount to melancholia. The mental faculties in other respects may be more or less affected. Active delirium sometimes occurs. Hemiplegia is developed sometimes gradually, and sometimes suddenly ; if the latter, it may be preceded by apoplectic coma, and is generally due to a hemorrhage which is incidental to the tumor. Epileptiform convulsions occasionally occur. Neuralgia affecting the three divisions of the trifacial nerve is a significant symptom in some cases. Hyperæsthesia and anæsthesia, generally affecting the side opposite to the seat of the tumor, are liable to occur; also muscular cramps in different situations. Vertigo, a staggering gait, inability to stand with the eyes closed, an impulsive tendency to either forward, backward, or rotatory motions ("compelled movements"), are marked symptoms in some cases. Aphasia may occur, either with or without right hemiplegia. Vision is often impaired, and is not infrequently lost. All observers agree as to the great frequency of morbid changes in the optic disk, showing either ischæmia (choked disk), neuro-retinitis, or atrophy. These changes may be marked, although vision be but little or even not at all impaired. Owing to their great frequency, or, as affirmed by some observers, their constancy, and their occurrence at an early period, the ophthalmoscope is of great service in the diagnosis. As expressive of the importance of ophthalmoscopic observations, the following is quoted from Obernier: "That which in the very beginning can be taken as a safe guide is the accurately ascertained condition of the optic papilla and retina, as well as the field of vision. For the change taking place in the optic disk indicates, as a delicate manometer, the increasing pressure in the cavum cranii; and this latter takes place pre-eminently and at an early stage in cases of intracranial tumors, quite independently of their situation."[1] The pupils are often dilated, and, in many cases, differ in size on the two sides. The sense of hearing in one or both ears is sometimes lost. Taste is impaired or lost, generally on one side of the tongue, in some cases. Strabismus with diplopia is not uncommon. Vomiting, evidently independent of gastric disease, that is, sympathetic, is rarely wanting. The nutrition and general condition are affected, *ceteris paribus*, accordingly as the tumor is benign or malignant, and in proportion as it is associated with important disease in other parts of the body. Tuberculous and carcinomatous tumors are especially characterized by emaciation and debility. The symptoms embraced in this enumeration are variously combined, and vary in degree in different cases. The diagnosis is established by their occurrence, successively, in greater or less number, and by the progressive course of the disease, the increase and addition of symptoms representing more and more damage caused by the growth of the tumor, and the local inflammation which it excites.

What circumstances point to the pathological character of the tumor? The number of intracranial tumors is considerable. Those common to the brain and other parts of the body are the tuberculous, carcinomatous and syphilitic, together with sarcoma, myoma, lipoma, osteomata, angioma hydatids, and cerebral aneurisms. Others are peculiar to the brain namely, glioma, neuroma, cholesteatomata, and psammoma. In many cases, to determine the character of the tumor is of clinical interest rather than of practical importance. With reference to treatment, however, it is of much importance to ascertain that it is probably syphilitic. The exclusion of a tuberculous and carcinomatous affection is desirable as bearing on the prognosis. There are no symptoms so distinctive of the syphilitic character that a positive diagnosis can be based thereon. Of a series of cases, the clinical histories embrace the same varied events which take place in connection with other tumors. Among these events, in addition to hemiplegia, are apoplectic coma, aphasia, epileptiform convulsions, prolonged somnolency, and dementia. Heubner states as a peculiarity distinguishing syphilitic from other tumors, notable fluctuations in the severity of symptoms, spontaneous improvement taking place from time to time. Improvement or recovery under anti-syphilitic medication is proof positive of the character of the affection. Syphilis should be suspected, especially in young subjects not affected with lesions of the heart or arteries suggestive of embolism, in all cases of hemiplegia, apoplectic coma, and aphasia. That the patient has had syphilis should, if possible, be ascertained from confession. Although persistently denied, the practitioner should not rest content with the assertions of the patient. Not only may the fact be denied when the denial is known to be false, but syphilis may have existed and the patient be not aware of the fact. This happens in women to whom the disease has been communicated by their husbands, and knowledge of its nature discreetly withheld by the physician. With a view to such a contingency, it is obvious that it would be sometimes indiscreet to make the inquiry. Whenever the fact cannot be ascertained from the patient's admission, examination should be made for the traces of the disease. The following enumeration of the most important of these is quoted from Heubner: "They are, cicatrices of different forms on the genitals, cicatrices from buboes, pigmented spots of circular shape on the skin, cutaneous cicatrices of different sizes, especially white, depressed spots, as large as a lentil or larger, on the skin of the forehead or on the shin bones, etc., where there are adhesions of the integuments to the subjacent bones; radiated cicatrices on the mucous membrane, especially of the mouth; rounded defects that look as if they had been cut out of the arches of the palate or the tonsils; irregularities of the surfaces of the bones, which present excavations surrounded by protuberances; a moderate, but usually very hard, swelling of the lymphatic glands, especially of the occipital, cervical, and cubital glands; enlargement and knobby induration usually of one testicle, or else atrophy of one testicle." It may be added that intracranial syphilitic disease is generally among the tertiary manifestations of syphilis. It is also to be added that, although knowledge of the fact that syphilis has existed is of great importance in the diagnosis, a pathological connection of the cerebral affection with that disease does not necessarily follow; in other words, a patient may have had syphilis, and the intracranial tumor be not syphilitic. A pathological connection, however, should always be considered as probable.

---

[1] Ziemssen's Cyclopædia, Am. edition, vol. xii. page 284.

Syphilitic disease within the cranium may end fatally within a short period from conditions giving rise to apoplectic coma. Recovery may be expected under anti-syphilitic treatment if the disease have not occasioned damage of cerebral tissue. In cases ending at length fatally, the duration not infrequently extends over many years.

Tuberculous tumors occur chiefly in childhood; age is, therefore, an element in the diagnosis. The coexistence of tuberculous disease in other organs, the lungs more especially, is a diagnostic point. The local symptoms are those consistent with tumor of the cerebellum, this being its seat in the majority of cases. Hereditary influence is to be taken into account. The termination is fatal sooner or later, the duration varying from a few weeks to five or six years. Absence of the foregoing diagnostic circumstances renders it probable that an existing tumor is not tuberculous.

The presumption that an existing tumor is cancerous may be based on the following circumstances: The age of the patient exceeding forty; the characteristic cachectic appearance; a family predisposition, and the existence of the disease in some other situation. It is very rare for all these circumstances to be present. Life may be destroyed before the appearances point to the cachexia; there may be no evidence of an inherited or family tendency, and the disease coexists elsewhere in only exceptional instances. A cancerous tumor sometimes leads to perforation of the skull, and appears externally, when, of course, its character is determinable. Cancerous tumors progress more rapidly than most of the others. The termination is invariably fatal after a variable duration.

Of the several tumors which are peculiar to the brain, glioma, in its varied forms, appears to be relatively the most frequent. Excluding, therefore, tuberculous, carcinomatous, and syphilitic tumors, the chances are that a tumor in any given case is gliomatous. Other circumstances diagnostic of this tumor are its occurrence after an injury of the skull, the slowness of its progress, and its comparatively little interference with the general condition of health.

Aneurism of one of the large cerebral arteries may form a tumor of a size varying from that of a filbert to a hen's egg. It is extremely rare for the latter size to be reached. The seat is oftenest the basilar artery, but it may arise from the middle cerebral, the internal carotid, the anterior cerebral, and other arteries. Cases of an artero-venous aneurism, caused by the rupture of a small aneurism of the carotid, or of the arterial coats, opening a communication with the cavernous sinus, have been reported. Under these circumstances, as Jaccoud states, exophthalmia is produced, and a bellows murmur is perceived by auscultation over the globe of the eye or the external lateral part of the orbital cavity. Sooner or later, in cases of aneurismal tumors, rupture takes place, and the result is a fatal apoplectic attack. Unilateral paralysis of cranial nerves having the characters of peripheral paralysis, and not accompanied by psychical disturbances, warrant a suspicion of the rupture of an aneurismal tumor.

The clinical histories in cases of hydatid tumors, according to Griesinger, as summarized by Jaccoud, offer the following diagnostic points: Epileptiform attacks precede other symptoms. These attacks, at first light and occurring after long intervals, become speedily more severe and frequent. At first, in the intervals, the general health is unaffected. When, however, the attacks have become frequent, they occasion a permanent condition of apathy and intellectual torpor. Hemiplegia occurs rarely, and not until a late period. Paralyses of the cranial nerves are exceptional. "The symptoms are diffused and bilateral. These features result from the fact that these tumors generally are seated in the gray cortical substance, or they are disseminated in many situations in both hemispheres. If the age of the patient be considered (over forty years), and the antecedent good health, the *ensemble* warrants at least a probable diagnosis."

What circumstances point to the seat of the tumor? The localization by means of the symptomatology is of much interest, although it may perhaps be said to have less importance, as bearing on the treatment, than that part of the diagnosis which relates to the pathological character of an existing tumor. Clinical studies with reference to the association of the symptomatic phenomena and the seat in cases of cerebral tumors, are of great importance in their physiological bearings, that is, as supplying data for determining the functions of the different parts of the brain. For knowledge in this direction thus far obtained, physiology is in a great measure indebted to pathological observations. Recent experimental investigations by means of electricity and local irritants, on lower animals, appear to show distinct psycho-motor centres corresponding to different cerebral convolutions. It is for clinical medicine to substantiate or refute conclusions thus obtained.

A signal instance of service rendered to physiology by pathology within late years, is the discovery that the faculty of speech, in most persons, depends on the integrity of a small section of the anterior lobe of the left cerebral hemisphere.

The diagnosis of tumors in respect of their localization is beset with difficulties. One of these is the imperfection of existing knowledge of the functions of different parts of the brain, notwithstanding the advancement made in this province of physiology. For example, although the physiological relations of the corpora striata are well established, those of the thalami optici are still open for discussion and difference of opinion. Another difficulty is, tumors occasion local effects, not alone by displacement or pressure upon the adjacent structures, but by exciting morbid conditions (congestion, inflammation, hemorrhage, softening) which are more or less extensive, and vary in many respects in different cases; moreover, they may produce effects at remote parts of the brain by transmitted excitation, emboli, etc. Again, the local effects of a tumor and the symptoms will depend much on its pathological character, and the rapidity or slowness of its growth. A benign tumor which grows very slowly, occasions, comparatively, but little injury; the adjacent structures become accustomed to it, and it may attain to a considerable size without giving rise to any well-marked symptomatic phenomena. A tumor may be so situated as to press upon cranial nerves at points removed from their centric connections; and this is a source of confusion in the localization. Still another source of confusion is the coexistence in some cases of several tumors which are in different situations. In spite of these difficulties, certain circumstances point to the seat of tumor in individual cases, and the accumulation of accurately observed and recorded cases, will, doubtless, afford data for enlarging the capabilities of diagnosis in this point of view, as well as shed further light on the physiology of the brain.

following condensed enumeration of the symptoms which are significant in the localization of tumors, is taken from Obernier:[1]—

1. *Symptoms denoting a situation close to the convexity.*—Notable headache; epileptoid attacks more frequent; paralysis and disordered sensibility not generally well marked or persistent. Psychical aberrations, frontal headache, disorders of olfaction, absence of or slight disturbances of sensibility on motion, and in some instances aphasia, if the situation be in the lobes.

Slight hemiplegia and unilateral disturbances of sensation, disturbances of motion in certain groups of muscles, aphasia in some instances, if the situation be in the parietal lobe.

Diffused headache, vertigo and convulsions, no considerable disturbance of motion, the senses, except of vision, rarely affected, if the situation be in the posterior lobe.

2. *Symptoms denoting a situation in the neighborhood of the Optic Commissure.*—Disturbances of olfaction and hemiopia, if the situation be anterior to the commissure.

Right- or left-sided hemiopia, neuralgia and anæsthesia of the fifth nerve (generally in all its branches), paralysis of the motor portion on the side of the tumor, diminished sensation and motion on the side opposite from the tumor, if the situation be laterally from the commissure.

Hemiopia, inward on each side, disturbances of motion of the eyeballs, unilateral paralysis, and the so-called circus movements, if the situation be behind the commissure.

3. Hemiplegia, associated with changes in the optic nerve and retina, the paralysis developed not suddenly but gradually, if the situation be in the corpus striatum.

4. Occipital neuralgia, no disturbances of sensation, vertigo, unsteady gait, forced movements backward, disturbances of the motions of the eyeballs and of vision, and occasionally of audition, if the situation be in the cerebellum.

5. Excessive disturbances of the motions of the eyes on both sides, very considerable disturbances of vision, and well-marked unilateral paralysis, if the situation be in the corpora quadrigemina.

6. Neuralgia, anæsthesia and paralysis of the fifth pair, disturbances in the functions of the fourth and the third nerve when the tumor tends forward, and paralysis of the sixth and portio dura of the seventh, when the tumor tends backward, then paralysis, generally on the side opposite to that of the hemiplegia, difficulty in deglutition, and rarely convulsions, if the situation be in the pons Varolii.

7. Disturbances of sensation, convulsions, difficulty of speed and of deglutition, and the presence, in some instances, of sugar in the urine, if the situation be in the medulla oblongata.

---

[1] *Vide* Ziemssen's Cyclopædia, Am. ed., vol. xii. The reader is referred, also, to Allbutt's works on the use of the ophthalmoscope, and to the recent treatise on Nervous Diseases, by Allan McLane Hamilton, M.D., page 200.

Treatment of Intracranial Tumors.

The confession must be made that, if syphilitic affections be excepted, the resources of therapeutics in the treatment of intracranial tumors are limited to fulfilling symptomatic indications, and prolonging life, as long as possible, by sustaining measures. It is unnecessary to enter into details respecting the treatment which the varied events and symptoms in particular cases may indicate.

Syphilitic affections admit of cure if the cerebral structures have sustained little or no damage; and notable improvement may often be derived from treatment when lesions prevent recovery. In a case of incomplete hemiplegia which had existed for several weeks and was gradually increasing, the paralysis disappeared completely within a fortnight under the use of the iodide of potassium. This case was observed more than five years ago, and the patient has been in perfect health up to the present time. The author has met with cases in which occurred epileptiform convulsions, quasi apoplectic seizures, delirium and aphasia, recovery taking place under treatment with mercury and the iodide of potassium. The importance of the diagnosis, and of treating doubtful cases as if the affection were due to syphilis, cannot be too strongly impressed. The antisyphilitic medication embraces especially the two remedies just named, and their employment is to be governed by the principles applicable to the treatment of the secondary or tertiary manifestations of syphilis in other situations. The importance of prompt and efficient treatment, before the brain has suffered much, if any, damage, is sufficiently obvious. Mercurial inunctions or fumigations have the advantage of a speedy effect. The iodide of potassium may be carried to high doses, namely, from one to two drachms daily. The latter is the remedy most likely to prove useful, and it may even effect a cure if the tumor happen to be aneurismal.

HEMIPLEGIA FROM, AND THE DIAGNOSIS OF, CEREBRAL ABSCESS.

Cerebral abscess involves inflammation of the brain substance, that is, suppurative cerebritis or encephalitis. Suppurative inflammation developed primarily in the brain substance—in other words, not secondary to meningitis—is always circumscribed. In different cases it has its seat in different parts of the brain. The local conditions which are represented by symptoms are as follows: Hyperæmia within the area of the inflammation; circumscribed meningitis if the seat be near the meninges; œdema more or less diffused around the inflamed area; the presence of pus in greater or less quantity, involving, of course, destruction of tissue and pressure; sometimes hemorrhage; the evacuation of the pus, in some instances, into the ventricles or upon the surface of the brain. The suppurative inflammation may run a slow or a rapid course, giving rise to the division of abscess into acute and chronic.

Hemiplegia is an occasional symptom in cases of cerebral abscess. Occurring in this pathological connection it is discriminated by means of the symptoms which distinguish abscess from other cerebral affections. We may pass at once, therefore, to the consideration of the diagnosis of abscess. Under the name abscess are not to be included encephalitis, with perhaps suppuration, which is incidental to a clot in the brain substance, to a tumor, or sometimes to necrobiosis from an embolus or a thrombosis. The occurrence of inflammation of the brain substance has already been referred to as an important event in the course of these affections, and it may often be recognized by intercurrent symptoms. The rare instances of small multiple purulent collections in cases of pyæmia—the so-called metastatic abscesses—are also not to be included. In cases of abscess, the space occupied by a collection of pus rarely exceeds the size of a goose's egg. In some cases, however, the purulent collection is much larger. In most instances there is only a single collection of pus, but there may be two or more abscesses.

The symptoms in cases of abscess are extremely varied. None are characteristic, all occurring in connection with other cerebral affections, and most, if not all, in cases of tumor of the brain. The order of their occurrence accords with the local conditions before and after suppuration. In the first stage, headache is a pretty constant symptom, and is prominent in proportion as meningitis is an element. Delirium and epileptiform convulsions may occur in this stage. Vomiting is a frequent symptom. The pupils are contracted. There is more or less febrile movement. These symptoms are marked in proportion as the affection is acute. In rapid cases, coma and death speedily follow, the duration being from one to two weeks. The symptoms in the first stage, or the stage of excitation, are sometimes not marked. They denote a subacute degree of inflammation. They may be so slight as not to point to a grave affection. The subsidence of pain, fever, delirium, convulsions—that is, of the symptoms denoting excitation—represents the occurrence of suppuration. Not infrequently there is a fallacious appearance of improvement, or even of convalescence; the abscess, in other words, remains for a time latent, and this period of latency may have a duration of many weeks. Oftener, however, after the formation of abscess there occur contractures, hemiplegia or other varieties of paralysis, and impaired intelligence; these symptoms dependent on the seat of the abscess, its size, etc. Apoplectic coma may occur from extravasation of blood, or the escape of pus into the ventricles, or on the surface of the brain. In other cases slowly developed coma precedes death.

The diagnosis, so far as the symptoms are concerned, is based, not on their significance individually or collectively, but on the order of their succession, that is, on the symptoms of excitation having preceded those of depression. The basis of the diagnosis, however, is chiefly in the etiology. It is questionable whether circumscribed encephalitis eventuating in abscess is ever an idiopathic affection. At all events, it is practically correct to say that it always follows certain obvious causes, namely, *first*, and most frequently, injuries of the skull; *second*, diseases of the ear; *third*, diseases of the nose or orbit; and, *fourth*, cases of the bony structure in other situations. More or less of the symptoms which have been named, occurring in the order of succession which is of diagnostic significance, preceded by either of the foregoing causes, justify in some cases, if not a positive, a highly probable diagnosis.

Treatment of Cerebral Abscess.

In a case of supposed cerebral abscess, recovery disproves the diagnosis. A collection of pus sufficient to give rise to symptoms on which a probable diagnosis can be based, is never absorbed. Becoming encysted, it may be tolerated indefinitely, but, sooner or later, the termination is fatal.

Rare exceptions to the rule as regards recovery are instances of abscess following injury of the skull in which the pus has escaped through an opening either caused by the injury, or made by the trephine. In 1850 a case was reported by Professor William Detmold, of an extensive fracture on the left side of the os frontis. After the removal of loose pieces of bone, the wound healed, and the patient was apparently well. Head symptoms were developed nine weeks after the accident. In a few days he became profoundly comatose. Under these circumstances Dr. Detmold laid bare the brain at the seat of the injury, and made an incision into its substance an inch in length, and half an inch in depth. Several ounces of healthy pus escaped. Consciousness at once returned, and improvement was progressive up to three weeks after the operation, when aphasia occurred, and headache, followed by stupor. Meanwhile the discharge from the abscess had never entirely ceased, and it was observed that the mental faculties were always improved after the escape of pus. Another incision into the brain substance to the depth of one and a quarter inch was made, a probe introduced into the incision passing into the lateral sinuses. This operation was not followed by any increase of the purulent discharge. Subsequently a third incision was made, and, following this, was the escape of half an ounce or more of pus. Death took place sixteen weeks after the accident, and the autopsy showed pus in both lateral ventricles, the septum lucidum being destroyed, and in the third and fourth ventricle.[1]

In a case reported by J. F. Weeds, Surgeon U. S. Army, the opening of an abscess was followed by recovery. This case occurred in 1868. The patient was a lieutenant of cavalry. A pistol ball entered the forehead just above the inner extremity of the superciliary ridge, and made its exit two and a half inches above the wound of entrance. Following the accident were symptoms of encephalitis, namely, intense headache, irregularly dilated pupils, spasm of the posterior cervical and dorsal muscles, mental obtuseness, tinnitus aurium; these symptoms associated with considerable fever. In about three weeks he was apparently convalescent, being able to be up and out of doors. A chill with rigor then occurred, succeeded by high fever, delirium, contraction of one and dilatation of the other pupil, the ophthalmoscopic appearances of optic neuritis, convulsions, and aphasia. Right hemiplegia followed, and at the end of a week from the recurrent attack he became profoundly comatose, with stertorous breathing and cyanosis. Trephining was employed, the dura mater, and the brain substance incised, giving exit to half an ounce of dark-green and somewhat fetid pus. The coma disappeared

---

[1] For the report of this case *vide* American Journal of the Medical Sciences, No. for January, 1850.

w hours, the patient improved rapidly without an
, and in two weeks was walking about convalescent.
and other cases which have been reported show the importance
cal interference when the diagnostic symptoms of abscess follow
ry. The situation of the abscess generally corresponds to the
the injury. There are some exceptions to this rule, encephalitis
produced at a distance by *contre coup*. In other cases the prac-
er can do no more than fulfil the indications derived from the symp-
in each case.

FUNCTIONAL HEMIPLEGIA.

Hemiplegia is to be considered as functional when unaccompanied by
mptoms showing either inflammation or structural lesion, complete
ecovery taking place after a duration varying from a few minutes to
everal weeks. That the affection is functional, in individual cases, is
rendered probable by the circumstances connected with its occurrence.
The probability is much increased by the absence of symptoms which are
diagnostic of inflammation or structural lesions, irrespective of the hemi-
plegia. Complete recovery within a brief period establishes the diag-
nosis.

Hemiplegia from embolism and thrombosis is functional always prior
to either softening or the extravasation of blood, and it does not become
otherwise if these effects be not produced, as is shown by complete re-
covery within twenty-four or forty-eight hours. The differential charac-
ters, when the hemiplegia is symptomatic of an embolus or a thrombosis
(*vide* page 530), are the same whether the vascular obstruction lead to
softening or hemorrhage, or not; complete recovery from the paralysis
within a brief period is the proof that these effects have not taken place.
The great object of treatment is the re-establishment of the circulation
within the area of the branches of the obstructed vessel, thereby prevent
ing the paralysis from becoming other than a functional affection.

The hemiplegia which occasionally follows epileptic paroxysms is fun
tional. It is not accompanied by symptoms denoting cerebral lesions
inflammation, and it is of short duration. If the epileptic convulsions
unilateral, the paralysis is on the affected side, and it corresponds to th
side on which the convulsive movements were most marked when the
have existed on both sides.

In rare instances, hemichorea leads to paralysis limited to the musc
of the side affected with the choreic movements. It is supposed that
paralysis in these instances is caused by minute thrombi or emboli; b
inasmuch as this pathological explanation cannot be regarded as fu
established, the choreic is to be reckoned among the varieties of functio
hemiplegia.

Hemiplegia is an infrequent form of paralysis occurring as a seque
diphtheria. Like the other paralytical affections which occur in
pathological connection, the absence of symptoms denoting either infla
mation or structural lesion, and the termination in recovery after a bri
duration, entitle it to be regarded as functional.

Intense mental emotions, namely, fear and anger, have been known give rise to hemiplegic paralysis. If the paralysis continue for only a brief period, it is functional; the most rational explanation, perhaps, being that which attributes it to unilateral spasm of the cerebral arteries.

Hysterical hemiplegia is undoubtedly extremely rare; paraplegia and local paralyses being much more frequent. Yet cases occur in which hemiplegia may be distinguished as hysterical. The author has reported a well-marked example with the following characters: The patient a young woman; sensory and motor paralysis occurring suddenly in the morning in the left leg; in the evening of the same day sudden loss of sensation and motion in the left upper extremity; the paralysis not involving the facial muscles or tongue; the temperature equal in the two sides; the mental faculties intact; the presence of hysterical symptoms, including retention of urine and the globus hystericus; the complete and sudden disappearance of the paralysis on resorting to the cold douche for the relief of an attack of hysterical convulsions excited by a thunderstorm; the sudden recurrence of the hemiplegia after a week, and recovery on the employment of the shower-bath.[1] These characters embody the diagnostic features. The coexistence of hysterical symptoms with hemiplegia is by no means proof that the latter is a functional affection, for the former may occur in cases in which the paralysis is due to cerebral hemorrhage, and softening from embolism or thrombosis. The diagnostic points in the case referred to, in addition to the coexisting hysterical symptoms, are the sudden occurrence of the paralysis first in one and subsequently in the other limb; the combination of sensory and motor paralysis; the paralysis affecting the left side; the absence of facial and lingual paralysis; the equality of the temperature on the two sides; the intellect unaffected; the sudden disappearance of the paralysis, its recurrence, and the recovery under the treatment addressed to the hysterical condition.

The foregoing varieties, namely, the epileptic, choreic, emotional, diphtheric, and hysterical, added to embolism and thrombosis, embrace the great majority of cases of functional hemiplegia. The different pathological associations are of importance in the diagnosis; but it is to be considered that these associations may exist, and the paralysis depend on inflammatory or structural affections. A positive diagnosis, therefore, requires the exclusion of the latter. On the other hand, hemiplegia is sometimes functional, as shown by speedy, complete recovery, when evidence of these pathological associations are wanting. Thrombosis or embolism is, perhaps, the most probable rationale in such cases.

Functional hemiplegia sometimes occurs as an intermittent affection. The author has reported a case of sudden and complete right hemiplegia without loss of consciousness or other cerebral symptoms, complete recovery taking place within an hour. During the following two weeks there were ten or twelve recurrences, the paralysis lasting for a few moments only. They then ceased, and several months afterward the patient was perfectly well. With our present knowledge, either embolism or spasm of the small arteries is to be invoked in explanation of these after a few hours, the patient improved rapidly without an unfavorable symptom, and in two weeks was walking about convalescent.

---

[1] *Vide* Principles and Practice of Medicine. Fourth edition, page 687.

These and other cases which have been reported show the importance of surgical interference when the diagnostic symptoms of abscess follow an injury. The situation of the abscess generally corresponds to the seat of the injury. There are some exceptions to this rule, encephalitis being produced at a distance by *contre coup*. In other cases the practitioner can do no more than fulfil the indications derived from the symptoms in each case.

FUNCTIONAL HEMIPLEGIA.

Hemiplegia is to be considered as functional when unaccompanied by symptoms showing either inflammation or structural lesion, complete recovery taking place after a duration varying from a few minutes to several weeks. That the affection is functional, in individual cases, is rendered probable by the circumstances connected with its occurrence. The probability is much increased by the absence of symptoms which are diagnostic of inflammation or structural lesions, irrespective of the hemiplegia. Complete recovery within a brief period establishes the diagnosis.

Hemiplegia from embolism and thrombosis is functional always prior to either softening or the extravasation of blood, and it does not become otherwise if these effects be not produced, as is shown by complete recovery within twenty-four or forty-eight hours. The differential characters, when the hemiplegia is symptomatic of an embolus or a thrombosis (*vide* page 530), are the same whether the vascular obstruction lead to softening or hemorrhage, or not; complete recovery from the paralysis within a brief period is the proof that these effects have not taken place. The great object of treatment is the re-establishment of the circulation within the area of the branches of the obstructed vessel, thereby preventing the paralysis from becoming other than a functional affection.

The hemiplegia which occasionally follows epileptic paroxysms is functional. It is not accompanied by symptoms denoting cerebral lesions or inflammation, and it is of short duration. If the epileptic convulsions be unilateral, the paralysis is on the affected side, and it corresponds to the side on which the convulsive movements were most marked when these have existed on both sides.

In rare instances, hemichorea leads to paralysis limited to the muscles of the side affected with the choreic movements. It is supposed that the paralysis in these instances is caused by minute thrombi or emboli; but, inasmuch as this pathological explanation cannot be regarded as fully established, the choreic is to be reckoned among the varieties of functional hemiplegia.

Hemiplegia is an infrequent form of paralysis occurring as a sequel of diphtheria. Like the other paralytical affections which occur in that pathological connection, the absence of symptoms denoting either inflammation or structural lesion, and the termination in recovery after a brief duration, entitle it to be regarded as functional.

Intense mental emotions, namely, fear and anger, have been known to give rise to hemiplegic paralysis. If the paralysis continue for only a brief period, it is functional; the most rational explanation, perhaps, being that which attributes it to unilateral spasm of the cerebral arteries.

Hysterical hemiplegia is undoubtedly extremely rare; paraplegia and local paralyses being much more frequent. Yet cases occur in which hemiplegia may be distinguished as hysterical. The author has reported a well-marked example with the following characters: The patient a young woman; sensory and motor paralysis occurring suddenly in the morning in the left leg; in the evening of the same day sudden loss of sensation and motion in the left upper extremity; the paralysis not involving the facial muscles or tongue; the temperature equal in the two sides; the mental faculties intact; the presence of hysterical symptoms, including retention of urine and the globus hystericus; the complete and sudden disappearance of the paralysis on resorting to the cold douche for the relief of an attack of hysterical convulsions excited by a thunderstorm; the sudden recurrence of the hemiplegia after a week, and recovery on the employment of the shower-bath.[1] These characters embody the diagnostic features. The coexistence of hysterical symptoms with hemiplegia is by no means proof that the latter is a functional affection, for the former may occur in cases in which the paralysis is due to cerebral hemorrhage, and softening from embolism or thrombosis. The diagnostic points in the case referred to, in addition to the coexisting hysterical symptoms, are the sudden occurrence of the paralysis first in one and subsequently in the other limb; the combination of sensory and motor paralysis; the paralysis affecting the left side; the absence of facial and lingual paralysis; the equality of the temperature on the two sides; the intellect unaffected; the sudden disappearance of the paralysis, its recurrence, and the recovery under the treatment addressed to the hysterical condition.

The foregoing varieties, namely, the epileptic, choreic, emotional, diphtheric, and hysterical, added to embolism and thrombosis, embrace the great majority of cases of functional hemiplegia. The different pathological associations are of importance in the diagnosis; but it is to be considered that these associations may exist, and the paralysis depend on inflammatory or structural affections. A positive diagnosis, therefore, requires the exclusion of the latter. On the other hand, hemiplegia is sometimes functional, as shown by speedy, complete recovery, when evidence of these pathological associations are wanting. Thrombosis or embolism is, perhaps, the most probable rationale in such cases.

Functional hemiplegia sometimes occurs as an intermittent affection. The author has reported a case of sudden and complete right hemiplegia without loss of consciousness or other cerebral symptoms, complete recovery taking place within an hour. During the following two weeks there were ten or twelve recurrences, the paralysis lasting for a few moments only. They then ceased, and several months afterward the patient was perfectly well. With our present knowledge, either embolism or spasm of the small arteries is to be invoked in explanation of these cases. Intermittent hemiplegia may, however, be associated with chronic meningitis and brain lesions. The following abstract of a case, reported by Dr. A. D. Rockwell, illustrates this fact: The patient, a stair-builder, aged 49, in the latter part of July, became paralyzed on the left side, with loss of speech, while at work, having previously been in fair health. The paralysis completely disappeared in twenty minutes. Another attack less severe occurred on the following day. During the following three weeks he had an attack every other day, always in the afternoon, the paralysis lasting from ten to fifteen minutes. Afterward the attacks recurred daily in the forenoon, and on some days there were three or four attacks. Early in September, the attacks became more severe. They occurred early in the morning and at intervals of from two to three hours during the day. Up to this time the general health had remained pretty good. In September, however, he became pallid and weak. Under treatment with general faradization and small doses of quinia, commenced on the 8th of September, the attacks ceased. On the 29th of September he was considered as well, and he resumed work. He remained so until Dec. 4th, when he had a severe attack, with inability to swallow; the intelligence not affected. Death took place the following night. "At the post-mortem the following conditions were revealed: Venous congestion of the surface of the brain; pia mater covered with a thin film of organized lymph; texture of brain softer than normal; choroid plexus enlarged and cystic; basilar artery and part of the circle of Willis enlarged and atheromatous, with a considerable amount of serous effusion at the base of the brain. No artery was ruptured; neither were we able to detect, in the course of a thorough and careful examination, any evidence of embolism or thrombosis."

---

[1] *Vide* Principles and Practice of Medicine. Fourth edition, page 687.

The considerable effusion at the base of the brain probably explains the fatal attack. Dr. Rockwell expresses the opinion that the great number of hemiplegic attacks of brief duration were due to "spasm of vessels, which may be supposed to be associated with, or caused by, molecular changes in the brain tissue." According to this view, the intermittent hemiplegia was a functional affection superadded to inflammatory lesions.[1]

In cases of functional hemiplegia, the paralysis claims no special treatment. The therapeutical indications pertain to the affections with which it is connected, the circumstances under which it occurs, and the associated symptoms.

---

[1] For the report of this case, *vide* The New York Medical Journal, Sept. 1877.

V.

PARALYSIS AFFECTING CRANIAL NERVES.

FACIAL PARALYSIS. GLOSSO-LABIAL OR BULBAR PARALYSIS.

THE diagnosis of the paralysis affecting the nerves distributed to the muscles of the orbit has been considered in connection with symptoms referable to the eye (*vide* page 467). The importance of determining whether these, as well as other, paralytic affections of nerves are caused by centric or peripheral morbid conditions, has been repeatedly adverted to, and the general rules by which a judgment is to be formed on this point have been stated (*vide* page 481). Sensory paralysis or anæsthesia of the special senses, severally, and of the trigeminus, have also been considered (*vide* pages 465, 468, *et seq.*). Paralysis affecting the hypoglossus, and glosso-pharyngeal nerve are embraced in the consideration of hemiplegia, and they enter, also, into a local paralytic affection to be presently considered, namely, glosso-pharyngeal paralysis. These nerves are very rarely paralyzed by peripheral causes. There remain to be considered paralysis of the facial nerve, and glosso-labial or bulbar paralysis.

FACIAL PARALYSIS.

This affection, called also Bell's palsy, histrionic or mimetic paralysis, is easily diagnosticated. Complete paralysis of all the facial branches divests the affected side of the face of expression. The eye remains open (lagophthalmus) when the patient is asleep, as well as awake, and winking is abolished. Wrinkles on the affected side of the forehead disappear. The cheek is flaccid and collapsed. The paralyzed side of the mouth drops, and saliva dribbles from between the imperfectly closed lips. The mouth, the nose, and, to some extent, the whole of the paralyzed side of the face are drawn toward the sound side, especially when the muscles of the latter are in action, as in speaking and laughing. The deformity is then conspicuous. The patient cannot whistle, and fluids escape in drinking. Articulation is interfered with, especially the pronunciation of labials, and certain of the vowels. By these obvious characters this paralytic affection is recognized without difficulty. Of course, in proportion to incompleteness of the paralysis, the appearances are less marked, and a slight degree of paralysis may be overlooked without due attention. The muscles on one side of the face in some persons contract more strongly than those of the other side, as a natural or an acquired peculiarity, giving fallacious appearances of a slight or moderate facial paralysis.

The important clinical questions, in cases of facial paralysis, are the following: Is the paralysis central or peripheral; if the latter, what is the nature of the local cause, and upon what portion of the nervous trunk does it act; is the paralysis functional, or, at all events, is the pathological condition one which admits of complete, and, perhaps, speedy recovery.

The paralysis is central, that is, it is symptomatic of a cerebral affection, when it occurs in connection with hemiplegia, or if associated with paralysis affecting other cranial nerves, and accompanied by symptoms denoting brain disease, namely, headache, vertigo, convulsions, or mental disturbance. In most instances the paralysis is either limited to, or it affects chiefly, the inferior facial branches. The orbicularis oculi is but little, or not at all, affected. A highly distinguishing feature is the preservation of reflex and electric excitability, the latter being sometimes increased. Deviation of the tongue occurs in the majority of cases, and, as this does not occur in peripheral paralysis, it is evidence of a central affection. It is important, therefore, to avoid an error of observation, which is, perhaps, not infrequent. The paralyzed half of the upper lip resting on the tongue when protruded, causes an appearance of lateral deflection, which is at once shown to be deceptive by raising, with the fingers, the angle of the mouth so as to make the two sides symmetrical. The author has for many years been accustomed to illustrate, in medical teaching, this source of error.

In peripheral paralysis, the superior, as well as the inferior, facial branches are generally affected; the paralysis is apt to be complete, presenting all the characters of typical cases. The soft palate on the affected side is often flaccid, and, when the pharyngeal muscles are in action, drawn toward the opposite side. The uvula may be deflected sometimes to the affected, and sometimes to the opposite, side; deflection of the uvula, however, is common in healthy persons. The reflex and the electric excitability are impaired or lost, and this point of contrast has an important bearing on the diagnosis.

The foregoing differential characters render it generally easy to determine, in particular cases, whether the paralysis be central or peripheral. In cases of the latter, it is often practicable to determine the seat of the pathological condition giving rise to the paralysis; that is, whether the nerve be affected either within the skull before it enters the internal auditory meatus, within the aqueduct of Fallopius, or after its emergence from the stylo-mastoid foramen. The paralysis is peripheral when the nerve is compressed or injured by intracranial tumors, after it leaves the pons Varolii, and before it enters the meatus auditorius. This is to be inferred when, in connection with symptoms denoting intracranial disease, the characters which distinguish a peripheral from a central paralysis are present, and when there is no evidence of the existence of causes affecting the nerve within the aqueduct of Fallopius, or after its emergence from the skull.

That the seat of the pathological condition causing the paralysis is within the aqueduct of Fallopius, is to be inferred from the existence of internal otitis, or caries of the temporal bone, the characteristics of peripheral paralysis existing. If the gustatory sense on the lateral half of the anterior portion of the tongue on the side of the paralysis be impaired or lost, the nerve is affected at a point between that at which the chorda tympani is given off, and the intumescentia gangliformis, or the ganglion geniculatum. If the sense of taste be unaffected, the nerve is intact to the point where the chorda tympani is given off.

That the nerve is affected after it has left the skull, may be inferred from the existence of disease of the parotid gland, or of a tumor so situated as to compress the nerve, and from the fact of an obvious injury or a surgical operation. When these causative connections do not exist, the inference is to be drawn from the absence of symptoms denoting intracranial or aural disease, the preservation of the gustatory sense, the velum palati being unaffected, reflex excitability being lost, and electric excitability preserved.

It is desirable to distinguish the cases of facial paralysis which are functional, or which do not involve lesions rendering recovery doubtful or impossible. In many of these cases the affection follows known exposure of the affected side of the face to a current of cold air, and this is one point of distinction. If the paralysis be limited to the superficial branches of the nerve, and the excitability by both the galvanic as well as the faradic current be preserved, important lesions may be excluded, and recovery will take place within a short period. These are called by German writers cases of rheumatic facial paralysis, this view of the pathology being purely hypothetical. Other cases of the same character, that is, of paralysis *a frigore*, differ in respect of electrical excitability. The susceptibility to the faradic current diminishes and disappears, while the reaction to the constant, or galvanic current, remains or may be increased. These cases end in recovery after a duration considerably longer than that of the milder form.[1]

The prognosis in cases of facial paralysis is to be based on the existence of lesions, and their character. When these are not determinable by symptoms other than the paralytical affection, a prolonged duration of the latter without improvement renders the prognosis unfavorable. A possible connection with syphilis is always to be considered with reference to anti-syphilitic treatment. Aside from indications which may be derived from causative lesions, the objects of treatment are the same, essentially, as in other paralytic affections. The most efficient therapeutic agent is electricity. Localized faradization and galvanization are both useful, and they may be employed in alternation if the muscles respond to each. If, however, the susceptibility to the galvanic current continue, the muscles not responding to the faradic current, the latter is of no use. The practical observations of Drs. Beard and Rockwell lead them to say that "A current just sufficient to produce contraction of the muscles, is better than stronger currents, and short applications are preferable to long ones."

It contributes to the restoration of the functional capacity of the paralyzed muscles, to obviate, by mechanical means, their elongation in consequence of the contraction of those on the sound side. Prof. Detmold has employed for this purpose a silver wire curved at each end, which is inserted into the angle of the mouth, and carried behind the ear.

---

[1] *Vide* Jaccoud. Pathologie interne, cinquième edition; also, Erb in Ziemssen's Cyclopædia, Am. ed. vol. xi.

This contrivance prevents the dropping of the paralyzed side of the mouth, and antagonizes the action of the muscles on the opposite side. It may, perhaps, prevent the permanent contraction of the latter, which is sometimes a consequence of prolonged facial paralysis.[1]

Facial paralysis is sometimes bilateral (diplegia facialis). The face is then on both sides expressionless. Except the paralysis be slight, it cannot escape observation, and it is not easily confounded with any other affection. In the loss of motor power over the lips and tongue, it corresponds with the affection to be next considered, namely, glosso-labial or bulbar paralysis; but in the latter the superior branches of the facial nerve are unaffected. Quoting from Erb, "When the disease is strongly marked, the lagophthalmus and lachrymation affecting both eyes, the difficulty which is experienced in moving the lips in speaking and laughing, the impairment of the articulation, the imperfectly performed movements of mastication, the incapacity of blowing, the escape of saliva and fluids from the mouth, the nasal tone of voice, and the difficulty of swallowing, all render the diagnosis easy." The only difficulty is in determining the seat and character of the causative, pathological conditions in different cases. The double paralysis may be caused by syphilitic or other disease seated in the medulla oblongata or the pons Varolii. A tumor may be so situated as to produce a central paralysis of the nerve on one side, and a peripheral paralysis by pressure on the venous trunk of the other side. Under these circumstances the paralysis affects the two nerves, not simultaneously, but one nerve is first affected with the characters of a central paralysis, and, after a time, the other nerve is affected, the latter having the characters of a peripheral paralysis. The two nerves may be affected coincidently by internal otitis or disease of the temporal bone occurring on both sides. In rare instances facial paralysis from exposure of the face to cold is bilateral. It may result from cerebral affections which give rise to hemiplegia first on one, and afterward on the other side.

In the interpretation, as regards pathological significance, of facial paralysis when bilateral, the points involved when the paralysis is unilateral, are to be applied to both sides instead of one side.

Glosso-Labial or Bulbar Paralysis.

Anatomically defined, this affection is a degeneration of the cells of certain nuclei seated in the medulla oblongata (bulbus medullæ), having its point of departure in the floor of the fourth ventricle, and extending therefrom slowly in different directions. Clinically, it is a local paralysis of the tongue and lips, embracing also, in the progress of the affection, the soft palate, pharynx, and larynx. The nerves affected are the hypoglossal, facial, spinal accessory, glosso-pharyngeal, pneumogastric, and in some cases, the motor root of the trigeminus. The combination of symptoms, the order of their occurrence, and the progressive character of the affection, constitute its typical features.

---

[1] Facial Paralysis treated by a New Method. By William Detmold, M.D., Tran[illegible] N. Y. Acad. of Med. New Series, vol. i. 1874.

The primary symptoms are defective articulation, diminished control over the lips in blowing, whistling, kissing, etc., and difficulty in carrying food from the mouth to the pharynx. The symptoms, at first slight, gradually increase, and the act of swallowing becomes labored. After a certain degree of progress the diagnostic characters are highly distinctive of the affection. The mouth is elongated, the lips are somewhat separated and fixed, giving to the face a lugubrious expression. The saliva escapes, requiring the constant use of the handkerchief. The tongue remains nearly immovable; the patient is unable to protrude it beyond the teeth, or raise upward the point. It becomes necessary to push the food backward into the pharynx with the finger. Deglutition is more and more difficult, and food is liable to be inhaled into the air-passages. Speech is lost, the effort producing only guttural sounds. The ability to masticate is diminished, or lost if the motor portion of the fifth nerve be involved. Taste and tactile sensation of the tongue are unaffected. The laryngoscope, in certain cases, shows paralysis or paresis of the vocal cords. In an advanced stage, respiration and the action of the heart are disturbed.

Observations appear to show, in opposition to the statement of Duchenne, that, as a rule, the paralyzed muscles, after a time, undergo degenerative changes, and become atrophied. Cases are found to differ as regards electric and reflex excitability.

The affection is not infrequently complicated with progressive muscular atrophy, together with the spinal lesions belonging to the latter. In pathological character these two affections are considered as identical. Paralysis of the tongue, lips, and pharynx may occur in connection with affections which are easily excluded, namely, double hemiplegia, disseminated sclerosis, the affection denominated by Charcot amyatrophic lateral sclerosis of the cord, and general cerebral paralysis. They are excluded by the absence of other symptoms by which these affections are characterized. The typical features derived from the clinical history distinguish the affection from embolism, thrombosis, and hemorrhage of the medulla. These occur suddenly, and are accompanied, at the outset, by apoplexy, or sometimes epileptiform convulsions; whereas bulbar paralysis commences imperceptibly, and is developed gradually. A closer resemblance may be produced by tumors in the medulla; but these give rise to cerebral symptoms and ophthalmoscopic changes which are wanting in the history of bulbar paralysis.

A continued, steady, and more or less slow progress, is one of the characteristics of this affection. The termination is fatal after a duration the extreme limits of which are one and five years. There are grounds for supposing that the few reported instances of recovery were not veritable cases of the affection. Death may occur suddenly from syncope, or suffocation from the passage of food into the larynx. If these accidents or some intercurrent disease be not the immediate cause of the fatal termination, it is due to inanition.

The lesions in bulbar paralysis do not admit of restoration, and a cure, therefore, is not to be expected. It is not, however, an unreasonable expectation that in some cases the progress of the disease may be arrested.

This is true sometimes of the corresponding affection of the spinal cord, namely, that which exists in cases of so-called progressive muscular atrophy. An arrest probably may be hoped for the more, the sooner the disease is recognized, and hence the importance of an early diagnosis. Next to an arrest of the disease, the desirable object is to secure the slowest possible progress of it. These two objects of treatment, namely, arrest and retardation of progress, are not to be effected by any special medication; or, at all events, clinical experience has not as yet established the efficacy of any remedies. The treatment, in the first place, should consist in the withdrawal of the patient, as far as possible, from all agencies which may be supposed to have been causative of the affection. Special causes, if they exist, are not known, but a rational supposition is that mental excitement, over-exertion of the mind, the use of alcoholic stimulants, dietetic excesses, nicotism, sexual abuses, etc., may promote its progress. In the second place, measures, medicinal and hygienic, to invigorate and maintain at the highest possible point the general condition of health, doubtless contribute to the two objects of treatment in this, as in other incurable affections. It is obvious that the particular indications falling within each of these divisions will vary according to the varying circumstances in different cases.

As in other paralytic affections, it is an object of treatment to prevent degenerative changes and atrophy of the paralyzed muscles, together with the impairment of functional capacity which is consequent on deficient exercise of function, by the employment of electricity. Erb gives the following as the most effective method of galvanization: "Galvanize with stabile applications transversely through the mastoid processes, and longitudinally through the skull, the so-called galvanism of the cervical sympathetic (anode on the nucha, and cathode at the angle of the lower jaw); and then induce movements of deglutition (twelve to twenty at each sitting); besides this, apply, according to circumstances, direct galvanic or faradic currents to the tongue, lips, and palate. The electric treatment must be continued for a very considerable time, with from four to seven sittings a week. The duration of a sitting should not exceed four or six minutes. The patients are frequently irritable and sensitive to a galvanic current, so that great caution must be taken in selecting the number of cells."

To avert death from inanition, when deglutition becomes extremely difficult or impossible, food should be introduced into the stomach by means of a flexible tube. If this be found impracticable or objectionable, rectal alimentation is to be resorted to. Life may be considerably prolonged by these measures.[1]

---

[1] Under the name Acute Glosso-Labio-Laryngeal Paralysis, Wilks has cited a case in which the characteristic features of the chronic affection were present, recovery taking place. *Vide* Guy's Hospital Reports, xxii. 1877.

VI.

SPINAL PARALYSES.

GENERAL SPINAL PARALYSIS. UNILATERAL SPINAL PARALYSIS. SPINAL HEMIPLEGIA AND HEMIPARAPLEGIA. PARAPLEGIA. ACUTE INFANTILE PARALYSIS, AND PARALYSIS FROM INFLAMMATION OF THE MOTOR TRACT IN THE ADULT.

THE greater number of intra-spinal affections, of which paralysis is a leading symptom, may be distributed into three groups, namely, as giving rise to general spinal paralysis, including spasmodic or spastic paralysis; unilateral spinal paralysis, and paraplegia. These forms of paralysis will be considered under separate headings. Paralysis dependent on inflammation of the anterior portion of the spinal cord in infants and adults will then be considered. The consideration of locomotor ataxia will follow, and, afterward, the cerebro-spinal paralyses, the myopathic paralyses, and the local paralyses affecting spinal nerves.

GENERAL SPINAL PARALYSIS.

The existence of general paralysis, that is, a paralysis affecting the upper and lower limbs, is easily ascertained. It may be complete, and it may vary from the slightest paresis to a degree of paralysis approximating to completeness. It may be complete in the lower, and incomplete in the upper, limbs, or *vice versa*. The degree of the paralysis may differ on the two sides. It may, or may not, be combined with sensory paralysis or anæsthesia. General paralysis from intra-cranial disease is easily excluded. If dependent on the latter, it is accompanied usually by an affection of one or more of the cranial nerves, and always by cerebral symptoms which corroborate the diagnosis.

Aside from acute spinal meningitis and myelitis, which have been considered (*vide* page 496), and of traumatic causes, namely, wounds, luxations and fracture with displacement, which are sufficiently obvious, and need not be here considered, the lesions giving rise to general spinal paralysis are chiefly meningeal hemorrhage, extravasation within the cervical portion of the cord, and spinal pachymeningitis. Chronic myelitis, compression of the cord incident to caries of the vertebræ, and intra-spinal tumors, in the vast majority of cases, give rise to paraplegia, and not to general paralysis. It will suffice to notice them in connection with the latter.

Meningeal hemorrhage, that is, either between the dura mater and the vertebral canal, within the arachnoid cavity, or in the sub-arachnoid space (hæmatorrhachis, meningeal apoplexy), must, of course, produce compression of the cervical portion of the cord in giving rise to general paralysis. The distinguishing points are the sudden occurrence of the paralysis, the patient falling as in apoplexy, but without loss of consciousness, unless cerebral meningeal hemorrhage have preceded; intense pain in the neck, arms, and shoulders; occurrence of muscular spasms, tremor, or contractures; the paralysis sensory, as well as motor, and most marked in the upper extremities; dyspnœa from paralysis of the muscles of respiration; difficulty of deglutition; a feeble and infrequent pulse, and death by apnœa within a short period, that is, within a few days or hours. It is corroborative of a probable diagnosis, if the paralysis follow an injury (contusion or concussion) of the spine, or violent muscular exertions.

The measures of treatment indicated by the casual pathological condition, are perfect quiet, and the application of cold to the spine.

Hemorrhage within the cord at its upper portion (hæmatomyelia, spinal apoplexy) causes also a sudden attack, the paralysis increasing more rapidly, becoming speedily more complete than in cases of meningeal hemorrhage, and without the occurrence of spasmodic or convulsive symptoms. Death takes place by apnœa, either suddenly or within a brief period, as in cases of meningeal hemorrhage.

The causal indications for treatment are the same as in meningeal hemorrhage.

Spinal, like cerebral, pachymeningitis is of two forms, namely, external and internal; the inflammatory products and the hemorrhage in the former being on the outer, and in the latter on the inner, surface of the dura mater. External pachymeningitis is usually associated with caries of the vertebra or suppurations in the vicinity, and it is very rarely seated in the cervical region. It cannot be discriminated from spinal meningitis. Internal pachymeningitis is usually associated with the same affection within the skull, and the cervical region is its seat in the majority of cases. The symptoms, according to Charcot, are pains in the back of the neck, preceding for some time (months) the occurrence of paralysis: paralysis of the upper extremities, leading to a claw-like appearance of the fingers; atrophy of the paralyzed muscles with impairment or loss of faradic excitability; paralysis of the lower extremities subsequently occurring, with contractures. The diagnostic characters warrant only a conjectural diagnosis. The course of the affection is unfavorable, ending fatally after a long duration.

General spinal paralysis is among the paralytic affections having a pathological connection with diphtheria and hysteria. Its occurrence in these connections is rare. With regard to the distinguishing points, it suffices to say that they are the same as in the more frequent forms of diphtheritic and hysterical paralysis. The prognosis and the therapeutical indications are also the same. These are examples of so-called functional paralysis. The prognosis, however, is not always favorable when the affection is functional. A variety described under the name "acute ascending paralysis" may prove rapidly fatal. The following brief description of this variety is quoted from Erb: "The disease is clinically characterized by a motor paralysis which generally begins in the lower extremities, spreads pretty rapidly over the trunk to the upper extremities, and usually, also, involves the medulla oblongata, which sometimes runs its course without fever, sometimes with more or less active fever, which but slightly involves the general sensibility and the functions of the bladder and rectum, and which runs its course without any notable atrophy of the muscles and without any diminution or change of their electrical excitability. In the majority of instances the disease terminates fatally, by asphyxia, paralysis of deglutition, and the like; but lighter cases may end in recovery." The most careful examinations by skilled observers have failed to discover any anatomical changes in the cord, in cases which have presented well marked the clinical characteristics of this variety of the affection. The author has met with at least two fatal cases, the histories of which corresponded with the foregoing description.

The affection called by Erb spasmodic or spastic spinal paralysis, and the analogous, if not identical, affection described by Charcot under the names amyothropic lateral sclerosis and spasmodic dorsal tabes, may be referred to in connection with general spinal paralysis. Dr. E. C. Seguin reported several cases, under the name "tetanoid pseudo-paraplegia," prior to those described by the authors just named, that is, in 1873.[1] The anatomical basis is considered to be sclerosis of the lateral columns of the cord. Seguin considers that a functional form of this affection was described by Prof. L. A. Sayre in articles published in 1870 and 1875, giving an account of a form of spastic paralysis occurring in children, characterized by spasms of muscles of the extremities, with paresis and defective co-ordination. These symptoms were attributed by Sayre to sexual irritation, being associated in girls with a reddened, irritable clitoris, and in boys with an adherent prepuce.[2]

As described by Erb, spasmodic spinal paralysis may be without prodromes, or it is preceded by pain in the back and limbs. Usually the lower limbs are first affected. If the paralysis become complete, which is rare, it is only in a late stage of the disease. Ataxia never occurs. Early in the disease, abnormal muscular movements occur, namely, jerking of the legs, especially at night and when fatigued, with stiffness of the muscles. Tremor is apt to occur when the point of the foot is placed on the floor, the patient sitting. The "reflex action of the tendons" is marked, that is, contraction of muscles is caused by percussion over their tendons. This author describes a "spastic gait" which is characteristic. The feet seem to cleave to the ground, and every step is accompanied by a peculiar hopping elevation of the whole body. This gait depends on muscular tension and reflex contractions in the various groups of muscles which are set in activity during the process of walking. Finally, in the progress of the disease, severe and permanent contractures ensue. There is no disturbance of sensibility. The muscles are not atrophied. The functions of the bladder and rectum, together with the sexual functions, are unaffected. The paresis gradually extends over the four limbs, and the muscles of the trunk become rigid, its movements being thereby difficult. In some cases the affection extends first to the two limbs on one side, being for a time spinal hemiplegia. Having reached a certain stage of progress, it may remain stationary for a long period—many years—and patients die with some intercurrent disease. In other cases the paralysis becomes complete; the body is stiff and immovable, requiring permanent confinement to the bed. Reflex excitability is increased. The electrical excitability is either normal or slightly diminished. Recovery is a rare exception to the rule.

---

[1] *Vide* N. Y. Archives of Medicine, February, 1879.

[2] For a paper by Prof. Sayre on this subject, *vide* Trans. Amer. Med. Association, 1875.

The amyotrophic lateral sclerosis, according to Charcot, is characterized by paresis, speedily followed by muscular atrophy, beginning in the upper limbs. The paresis is accompanied by twitchings of the muscles. Contractures follow, causing the arm to be pressed to the trunk, the forearm half flexed and pronated, the hand and fingers strongly flexed. The lower extremities become affected usually from six to nine months after the commencement in the upper limbs. Death takes place after a period of from one to three years. The fatal termination is preceded by the manifestations of bulbar paralysis.

Although the clinical descriptions by Erb and Charcot differ in certain respects, namely, in Charcot's cases the commencement of the paralysis being the upper extremities, muscular atrophy occurring speedily, and bulbar paralysis taking place, the agreement in other points, and the anatomical lesion, in a limited number of autopsies, render it probable that both affections are essentially identical.

In the great majority of cases, so far at least as the author's experience goes, general spinal paralysis, exclusive of traumatic causes, arises from pathological conditions admitting of recovery. The prognosis, as based purely on probabilities, is good. An analysis of thirteen recorded cases, in 1866, gave a mortality of two; in five cases the recovery was known to have been complete, and in six the recovery was nearly complete at the last date of observation. Complete paralysis of the diaphragm does not occasion death. In two cases ending in recovery, the diaphragm was completely paralyzed, as shown by the absence of the diaphragmatic movements in respiration, and, by exciting the Schneiderian membrane with snuff, the desire to sneeze was intensely felt and the grimaces were made without the act of sneezing. In one of these cases the patient passed through lobar pneumonia with safety, the disturbance of respiration being very great and apparently placing life in jeopardy.

The treatment of general spinal paralysis has reference to causal indications when they can be ascertained. Aside from these, the measures indicated by paralysis *per se* are to be employed (*vide* page 482). In cases of spasmodic spinal paralysis, the galvanic electric current offers most. Erb recommends a "reasonably conducted water cure." Strychnia is contraindicated.

UNILATERAL SPINAL PARALYSIS. SPINAL HEMIPLEGIA AND HEMIPARAPLEGIA.

A motor paralysis limited to the upper and the lower limb on the same side, and dependent on an affection of the medulla spinalis, is distinguished as spinal hemiplegia. Following precedents in which diseases are designated by the names of those who have discovered them or established their individuality, this paralytic affection might with propriety, as has been suggested, be called the Brown-Séquard paralysis. Hemiparaplegia is a paralysis limited to one of the lower limbs. In spinal hemiplegia the affection of the cord is situated above the origin of the nerves distributed to the upper extremity; in hemiparaplegia either the dorsal or the lumbar portion is the seat of the affection.

The unilateral character of the paralysis denotes an affection limited to a lateral half of the spinal cord. The affection of the cord is on the side of the motor paralysis. Sensory paralysis or anæsthesia exists on the opposite side (hemi-anæsthesia). The latter corresponds, in extent, to the motor paralysis, that is, it extends over the entire side in hemiplegia, and over the lower limb, and more or less of the trunk, in hemiparaplegia. On the side of the spinal affection there is more or less hyperæsthesia of the skin; the muscular sensibility is lessened; the reflex excitability may be either increased or diminished; and the temperature is somewhat raised. At the upper boundary of the hyperæsthesia on this side, within a narrow strip of skin, there is often anæsthesia (anæsthetic belt). On the side opposite to the spinal affection, the anæsthesia, which extends exactly to the median line, is accompanied by normal muscular sensibility and temperature.

The diagnosis of spinal hemiplegia and hemiparaplegia offers little or no difficulty. Cerebral hemiplegia is excluded by the absence of facial paralysis, together with other symptoms pointing to intra-cranial disease. Hemiparaplegia from an affection of the cauda equina on one side, is distinguished by the fact that the sensory and the motor paralysis are on the same side.

To determine in particular cases the nature of the affection of the cord is not as easy. Unilateral paralysis may result from a wound, a fracture, or a dislocation which injures only a lateral half of the cord. In these cases the problem is simple. But the paralysis may proceed from intra-spinal tumor, hemorrhage in one half of the cord, myelitis, and an unilateral circumscribed sclerosis. In the diagnosis of these different affections, the same principles are to be followed as in cases of bilateral paralysis in which these affections exist without the same limitations. A similar statement is to be made with reference to the treatment of unilateral spinal paralysis.

The following illustrative case has been kindly communicated to the author by Dr. Andrew H. Smith: Mr. S., aged 56, engaged in financial operations involving considerable anxiety and mental strain, accustomed to the excessive use of tobacco, had been suffering for a week from gastric disturbance, for which he had taken cathartics and been on reduced diet. "While playing cards on the evening of November 18, he seemed listless and uninterested, and suddenly complained of feeling 'strange,' and then fell over to one side. I saw him within twenty minutes. He was then conscious, and talking excitedly with a thick utterance. Left side quite limp, but in a few minutes regained almost complete power of motion. Persistent dry retching. Dr. Chalmers, the family physician, arrived five minutes after. An hour later the following condition was noted: body cool and covered with perspiration, especially the right side. Hair on the right side wet. Sensation on right side unimpaired, including face. Motion on left side irregular, jerking, without precision, imperfectly co-ordinated. Rotation of the head to the left. Pulse 72, rather feeble, but becoming stronger. Speech slightly thick; tongue covered with a white fur, tip and edges red. Pupils normal in size, and sensitive. Respiration during sleep somewhat noisy and puffing; no distortion of face; no deviation of tongue. Mind clear.

"About four hours after the beginning of the attack the pulse began to rise, and in the course of half an hour it reached 144, and was very irregular. Patient extremely restless. A hypodermic injection of eight minims of Magendie's solution produced little effect; eight minims more, together with an ounce of whiskey thrown into the rectum, soon brought the pulse down to 80, and gave it regularity and volume. The following morning the pulse was 72: the patient unable to sit up alone; symptoms unchanged. During the ten days following there was but little change. The urine, when examined a month later, was found to contain a little sugar. About this time a large carbuncle developed between the scapulæ, and was soon followed by two more. These were incised, and the discharge from them was very profuse and exhausting. Dry gangrene of the right foot followed, and the patient died about the close of February."

In a case reported by Dr. Henry Jones, illustrative of spinal hemiplegia, there were present, as in the foregoing case, some symptoms involving cranial nerves.[1]

PARAPLEGIA.

The term paraplegia denotes a bilateral paralysis limited to either the two lower or the two upper limbs. The latter is extremely rare except at the beginning of a paralytic affection which extends from the upper to the lower limbs, that is, becoming general. It suffices, therefore, to consider the term as denoting a bilateral paralysis of the lower limbs. Paraplegia from cerebral lesions is so infrequent that it may be practically assumed to be always symptomatic of a spinal affection. The absence, however, of cerebral symptoms renders it easy to exclude intracranial disease. Of the different varieties of spinal paralysis, paraplegia is by far the most frequently met with in medical practice. Different cases of paraplegia present, as regards the degree of the paralytic affection, variations from the slightest paresis to complete paralysis. They vary also in other circumstances which are of importance in diagnosis.

The existence of paraplegia is readily determined. It is to be discriminated from locomotor ataxia. The differential characters have been considered (*vide* page 482). They are sufficiently simple. Ataxia may exist without paraplegia, and it is easy to recognize its separate existence clinically. So, also, paraplegia may exist without ataxia, but the existence of a considerable degree of paralysis prevents the characteristic motor manifestations of the latter. Not infrequently paraplegia and ataxia are combined in proportions which vary in different cases. If the paralysis be moderate or slight, the proportionate amount of the ataxia can be estimated without difficulty.

---

[1] *Vide* Am. Journ. of Med. Sciences, October, 1877. A typical case, reported by Gläser, is contained in Jahresbericht von Virchow und Hirsch, 1877, p. 132.

The problems in diagnosis which are more or less difficult relate to the differentiation of the different spinal affections giving rise to paraplegia. Exclusive of wounds or injuries, acute spinal meningitis and myelitis (*vide* page 496), together with multiple sclerosis, infantile spinal paralysis and the analogous affection in the adult, the last-named diseases being reserved for separate consideration, the affections to be differentiated in cases of paraplegia are, chiefly, hemorrhage, meningeal and into the substance of the cord, chronic spinal meningitis and myelitis, compression by tumors, or in cases of spinal curvature, and the unknown conditions distinguished as functional.

A probable diagnosis of meningeal hemorrhage may be formed if a patient be suddenly attacked with localized pain in the spine, extending thence to the loins, bladder, genitals, and lower limbs, accompanied by spasmodic movements of the muscles, tremor, or contractures, and speedily followed by paresis, with more or less anæsthesia. Complete paralysis is exceptional. The foregoing symptoms are unaccompanied by fever. If the extravasation be into the lumbar region, the bladder and rectum are paralyzed, and reflex excitability is lost; if limited to the dorsal region, the reflex excitability is preserved. The diagnosis is strengthened by the fact of the attack occurring after a severe muscular exertion such as lifting a heavy weight. Corroborative evidence is afforded by the fact that little or no fever occurs; by the paralysis remaining stationary after reaching a certain degree, and by subsequent progressive improvement, recovery taking place after a few weeks or months.

Hemorrhage within the cord in the lumbar region (spinal apoplexy) offers these points of difference: The sudden attack of localized pain is at once or very quickly characterized by paraplegia; the paralysis, as a rule, is immediately or very soon complete; spasmodic movements, tremor, and convulsions, are slight or wanting, the paralyzed muscles remaining flaccid; anæsthesia is more marked; reflex excitability is lost, and the muscles are rapidly atrophied. If the hemorrhage take place in the dorsal region, respiration is affected, and reflex excitability may be retained. The course of paraplegia dependent on hemorrhage within the cord is unfavorable, even if the situation be below the point at which danger from disturbance of respiration is involved. Bed-sores form early. Secondary myelitis is apt to be developed. The termination is generally fatal, and complete recovery rarely, if ever, occurs.

Chronic may follow acute spinal meningitis (inflammation of the pia mater). If the latter have been diagnosticated, the diagnosis of the former is a fair inference. In most instances, however, the chronic affection is subacute *ab initio*, commencing imperceptibly, and developing slowly. After certain obscure symptoms, such as pain and a sense of weight in the back, increased by movements of the spine, shooting pains in the bowels, various disordered sensations (paræsthesiæ), and an increasing sense of weakness—these symptoms having existed for a variable period—paraplegic paresis becomes evident. The paralysis slowly increases during months, or even years, and rarely becomes complete. The degree of paralysis is often variable, fluctuating from day to day. Anæsthesia is slight or wanting. If, now, the paraplegia, together with the associated symptoms, slowly diminish, and recovery take place, either with or without complete restoration of the antecedent motor power over the lower limbs, the inference is that the inflammation is limited to the meninges, that is, the disease is purely a meningitis, or that the substance of the cord is but little implicated. If, on the other hand, the progress be unfavorable, the paralysis increasing, cutaneous anæsthesia supervening, with loss of reflex and electrical excitability, the muscles becoming atrophied, the functions of the sphincters failing, it may be concluded that the inflammation is not limited to the meninges, but the substance of the cord is involved, that is, meningo-myelitis exists.

Chronic myelitis, giving rise to paraplegia, is distinct from sclerosis of the posterior columns in locomotor ataxia, of the lateral columns in spasmodic amyotrophic paralysis, of the anterior portion in the so-called infantile paralysis, and from the disseminated nodules in multiple sclerosis. The anatomical condition in a considerable proportion of the cases of paraplegia is an inflammation, circumscribed as regards its vertical extent, but extending throughout the cord in a transverse direction (myelitis transversa). Comparing typical cases of chronic meningitis and of chronic myelitis, the latter offer the following differential points: The paralysis occurs with the symptoms denoting irritation—shooting pains, spasmodic movements, tremor,—less marked; it is greater in degree; there is more anæsthesia; the sensory conduction is retarded; the sphincters are earlier paralyzed; reflex and electrical excitability for a time are more active, in the progress of the disease both being lost, the latter fact denoting either disorganization of the gray substance, or of the roots of the nerves. Atrophy of the muscles follows the loss of reflex and electrical excitability. Another point of difference is the extremely small probability of recovery. The persistence of the paraplegia, however, may not interfere with perfect general health, nor shorten the duration of life; but in the majority of cases the disease is slowly progressive, and after a long duration, perhaps for several years, it leads to a fatal termination.

The differential diagnosis of chronic meningitis and myelitis, in cases of paraplegia, is confessedly often difficult, and not seldom impracticable. There is a good pathological reason for this, namely, chronic meningitis, as a rule, involves more or less of myelitis, and *vice versa*.

Intra-spinal tumors, meningeal, and, in rare instances, developed within the cord (intra-medullary) produce paraplegia by pressure, and by exciting meningo-myelitis (myelitis from compression). The diagnostic points are: The gradual development and increase of paresis for a certain period, without symptoms denoting inflammation of the meninges, or of the cord; the subsequent occurrence of these symptoms; the slow or rapid, but steady increase of the paralysis, and, finally, the evidence of disorganization of the cord afforded by complete paralysis and anæsthesia, with loss of reflex and electrical sensibility, etc. The occurrence of hemiparaplegia prior to the bilateral paralysis, in some cases, is a point of significance.

With reference to the diagnosis of the kind of tumor, the following quotation from Erb expresses concisely the resources of the diagnostician: "We may infer a peripachymeningitic exudation if Pott's disease, or a marked scrofula exist; a carcinoma, if there be cancer of the vertebræ, or primary cancer of some other part; a syphiloma, if syphilitic infection can be demonstrated; an echinococcus, if the parasite have been found in other organs, or tumors containing the cyst are demonstrated near the spine; a neuroma, if neuromata are found in peripheral nerves, etc. In most cases, however, we shall be forced to confine ourselves to guesses."

Paraplegia, in caries of the vertebræ, if there be bony displacement or angular curvature, may be due to compression, but oftener to the products of inflammation excited by the vertebral affection. The pathological connection with the latter is, of course, evident. There is much ground for the expectation of improvement or recovery in these cases, under treatment by measures which relieve the cord from pressure, the dependence of the paralysis thereon being shown by the result.

In a certain proportion of the cases of paraplegia the paralysis is referable to neither inflammation, structural lesions, nor mechanical compression, and it is, therefore, to be considered as functional. Functional paraplegia occurs not infrequently in connection with diphtheria and hysteria. It is not confined to these pathological relations. The so-called reflex paraplegia is a functional affection. The term is open to criticism, inasmuch as the pathological doctrine which it embodies is based on hypothesis, or, at least, a solid clinical basis is wanting. The latter should consist of a collection of cases of paralysis occurring secondarily to diseases of the bladder, kidneys, etc., sufficient in number to render it certain that the association was not due to coincidence, and to overweigh the fact that of the local diseases which it is conjectured may give rise to paralysis by reflex excitation, in the vast majority of cases there is no paralytic complication.

Paraplegia, occurring as a sequel of diphtheria, or in association with hysterical manifestations, is presumably functional. But it is to be borne in mind that these connections do not preclude intra-spinal inflammation, or structural changes. As a rule, in functional paraplegia the paralysis is incomplete, reflex and electrical excitability remain, the bladder and rectum are not involved; but there are exceptions in this regard. The motor may be accompanied by complete sensory paralysis; but this is exceptional. The sudden or rapid disappearance of the paralysis is evidence of its functional character. In some hysterical cases it occurs suddenly, disappears as suddenly, and it may recur repeatedly. In general, the diagnosis, irrespective of the pathological connections, is to be based on the points just stated, together with the absence of symptoms added to the paralysis, which are diagnostic of hemorrhage, meningitis, myelitis, and tumor.

Treatment of Paraplegia.

The objects of treatment relating to the nutrition and functional capacity of the nerves and muscles involved, have their place here as in other paralytic affections. Friction, shampooing, passive movements, volitional exercise, and electrization are indicated for these objects. They are, however, subordinate to pathological indications, that is, to those pertaining to the morbid conditions of which the paralysis is symptomatic.

Hemorrhage, meningeal or intra-medullary, calls at first for absolute rest and cold applications to the spine. Ergot may be useful. The after-treatment relates to the condition of the paralyzed organs.

In cases of chronic meningitis, or of meningo-myelitis, the symptoms denoting a predominance of meningeal inflammation, counter-irritation over the spine is doubtless serviceable. The author cannot, from personal observations, bear testimony either to the good or bad effects of severe measures, such as the moxa, setons, issues, and cauterization with the hot iron. It is probable that all the benefit to be derived from counter-irritation may be secured by milder methods, namely, by blisters, stimulating liniments, the application of a hammer heated by immersion in hot water ("firing"), and dry cupping. The latter is more especially to be recommended. Douches with hot water, the warm bath, and the thermal springs are among the measures which are found useful. With regard to these, the immediate effect, as determined subjectively by the patient, is perhaps the most reliable guide in deciding either to continue or discontinue their use. The same statement may be made concerning the wet pack applied to the spine. The propriety of abstracting blood by cups or leeches becomes a question only when the general condition of the patient is robust.

Rest cannot be of less importance in the treatment of this than of other inflamed parts. Confinement to the bed, however, is objectionable on the score of its unfavorable effect upon the general health. Rendering the spinal column immovable by means of the plaster-of-Paris jacket, employed by Professor Sayre in cases of Pott's disease, is worthy trial with a view to more complete rest of the cord than is practicable even by confinement to the bed, and as allowing exercise in walking, if the paralysis be not complete. This exercise should have limitations derived from the sensations and experience of the patient. It should not be carried to the extent of causing uneasiness or pain in the back, nor should it occasion undue fatigue.

The medicinal treatment, with a view to a curative influence, embraces two remedies, namely, the iodide of potassium and mercury. One or both of these should be employed in cases with a syphilitic history, and each may be useful in some cases in which there is no reason to suspect the existence of syphilis. Ergot and belladonna have been much prescribed of late years, with but little clinical evidence of their utility.

Pain in the back and limbs may be so severe as to require palliation by opiates. These should be given only when required, in order to avoid the formation of the opium habit, and on account of their effects on appetite and digestion. A nutritious alimentation and general invigoration by all available hygienic measures, are important factors in the treatment.

In a large proportion of the cases of paraplegia dependent chiefly on spinal meningitis, the paralysis continues with perhaps more or less improvement. In not a few cases, the progress denotes myelitis with disorganization of the cord; the paralysis becomes complete; cystitis occurs, and the termination is fatal. On the other hand, recovery takes place in some instances after the paralysis has existed for a long period. The author has reported a case of recovery in which paraplegia had existed for five years, the patient having been confined to the bed for three years.[1]

The testimony of late writers, whose opinions are trustworthy, is adverse to the severe methods of counter-irritation in cases of chronic myelitis. This is true also of thermal baths, especially those of a high temperature. The latter appear to have been excessively and indiscriminately employed in cases of paraplegia by French and German practitioners. While in meningitis, under judicious restrictions, they are often useful, in myelitis they are not infrequently injurious. Jaccoud testifies with regard to severe counter-irritation in the following emphatic terms: "I have visited the thermal stations which are the richest in cases of chronic paraplegia; I have seen Ragatz and Gastein; I have interrogated there a goodly number of patients having myelitis complicated by cauteries and moxas, and I have not met with a single instance in which the least benefit followed this severe treatment; and these negative results were so completely in accordance with those obtained from my own practice, that I have for a long time entirely renounced the employment of the methods just named, inclusive also of the seton." Jaccoud, however, on the basis of clinical experience, testifies to the usefulness of superficial cauterization with the red-hot iron. He does not claim to have cured chronic myelitis by this measure, but to have obtained thereby improvement and a temporary arrest of symptoms denoting the progress of the disease.

The testimony of Erb is against counter-irritation and derivatives, with the exception of dry cups over the spine. He believes all the varieties of baths at high temperatures to be injurious and dangerous. The thermal brine baths at a moderate temperature (78° to 86°) he has found innocuous, and in more than half the cases noted they were beneficial. He prefers, however, the employment of cold water by "simple rubbing with wet cloths, foot-baths and sponging the back, hip-baths, half baths with affusions to the back, local compresses to the back left on till they become warm," etc. Wet packs to the entire body have proved injurious. It is dangerous for patients to be treated at water cures by over-zealous hydropathists. In Erb's experience, galvanization of the cord is useful. Out of one hundred cases treated, he obtained a more or less favorable result in fifty-two.

Medicinal treatment having direct reference to the spinal disease, is of little use in cases of myelitis. The iodide of potassium is limited in its usefulness to syphilitic cases. The nitrate of silver has been thought to be sometimes beneficial. Strychnia is considered as objectionable. Arsenic and phosphorus are in the same category.

Securing rest of the spine from movements of the body by means of the plaster-of-Paris jacket, rationally considered, is applicable to myelitis not less than to chronic meningitis.

The habits of patients are to be regulated with reference to hygienic reforms and general invigoration. The abuses of venery, alcoholics, and tobacco are to be corrected. It is probable that these enter into the ætiology of the disease.

---

[1] *Vide* Principles and Practice of Medicine, 4th edition, page 696.

Recovery is to be expected only in very rare instances. The utmost to be hoped for, in the majority of cases, is that the disease will not progress, or that it will progress very slowly.

Intra-spinal tumors, with the exception perhaps of those which are syphilitic, offer very little ground for the expectation of improvement. In most cases the tumor progressively increases in size, the paralysis from compression is proportionally increased, and at length destruction of the cord is a result of meningo-myelitis. If the patient have had syphilis, the anti-syphilitic treatment is to be pursued. Excluding syphilis, there is no special medication to be employed; symptomatic indications are to be met, and measures adopted to promote, as far as practicable, the general health.

In cases of paraplegia dependent on disease of either the vertebræ or the intervertebral cartilages, the paralysis may be wholly due to compression from projection of bone or curvature; but generally, in addition, there is exudation from secondary spinal meningitis. Recovery sometimes takes place with ordinary rest and symptomatic treatment. The author has reported a case in which paraplegia was developed six months after an injury which led to angular curvature of the spine. After three years and a half the patient recovered, and was able to do the work of a laborer for five years. Complete paralysis, both motor and sensory, then occurred. He again recovered after a year and a half, and worked for four years. The paralysis recurred a second time at the end of this period. Two months afterward, when the patient was lost sight of, there was improvement.

Relieving the cord from pressure, thereby removing also the exciting cause of inflammation, is the most important desideratum in the treatment. The method of treating Pott's disease inaugurated by Prof. Sayre, and practised by him with brilliant results here and abroad, fulfils this desideratum simply and satisfactorily. This method consists in suspending the body so that its weight causes the requisite extension of the spinal column. A sensation of comfort felt by the patient is the criterion of the desired degree of extension; and the spinal column is then made immovable by means of the plaster-of-Paris jacket, which is so contrived and applied that it may be worn indefinitely without discomfort. The success of this treatment is in some instances so wonderful as to seem almost miraculous. The author is cognizant of the case of a man about fifty years of age, having had angular curvature from youth, who suddenly became completely paraplegic. He kept the bed for over three years, suffering during this period extremely from pain and reflex spasms of the lower limbs, the movements of which were so great as to require to be restrained by mechanical appliances. To obtain relief from his sufferings he had become addicted to the use of morphine, hypodermically, in large doses. His emaciation was very great, especially of the lower limbs. As preliminary to the treatment by Prof. Sayre's method, he desisted at once from the use of opiates, and struggled through the terrible distress which accompanies the interruption of the opium habit. His debility was so great that Prof. Sayre was apprehensive lest there might be hazard in the suspension. It was, however, done, and the patient experienced instantly a sense of relief. Directly after the jacket was applied, he was able to move his legs slightly. In six days he sat up three hours. After a few days more he was able to walk. Nine months have now elapsed. He mounts the stairs to his room in the fourth story without inconvenience. His general health is good. He has increased much in weight, and there is a notable change in the size of the lower limbs. He has been able to resume his profession as an artist.

Prof. Sayre has kindly furnished the author with a list of the cases of paralysis and Potts' disease treated by him up to the present date (July, 1878). The number is twenty-three. In every case immediate improvement was more or less marked. In one of these cases the patient, who for five years had been unable to stand without a brace and support from placing his hands upon the thighs, walked without any support from the hospital, a tenth of a mile. Another patient at once walked freely, who, before the application, was unable to stand without support. Another patient who was unable to stand without support, was instantly able to run about with no assistance.

The case of the artist, and other of the cases in Prof. Sayre's list, show that the paralysis incident to Potts' disease may continue for several years without the occurrence of lesions of the cord which preclude recovery. A great merit of the method, aside from the effectual relief of compression of the cord, is, it allows at once of the fullest practicable exercise of the paralyzed muscles, conducing thereby to the recovery of motor power and to improvement of the general health. It is probable that the latter advantages will measurably accrue from the employment of the method in cases of paraplegia dependent on spinal meningitis and myelitis not connected with vertebral disease.

In functional paraplegia, recovery is simply a question of time. Recovery may take place either suddenly, rapidly, or more or less slowly. The general condition claims appropriate treatment. In diphtheric paralysis almost invariably, and in hysterical paralysis very frequently, anæmia is measurably concerned in the paralytic affection. Measures to be addressed directly to the latter are, faradic electricity, friction or massage, the cold douche, and volitional exercise if the paralysis be not complete.

VII.

SPINAL PARALYSIS FROM INFLAMMATION OF THE MOTOR TRACT.

ACUTE INFANTILE SPINAL PARALYSIS. INFLAMMATION OF THE MOTOR TRACT IN THE ADULT.

INFLAMMATION of the motor tract of the spinal cord is an affection which, especially in infants, is distinguished by marked clinical characteristics. The name here adopted has been suggested by Prof. E. C. Seguin.[1]

---

[1] *Vide* Transactions of the N. Y. Academy of Medicine.

Other names are, anterior spinal paralysis, essential paralysis of infancy, infantile paralysis, atrophic paralysis of infancy, organic infantile paralysis, myelitis of the anterior horns, anterior poliomyelitis. Until lately the affection has been regarded as peculiar to infantile life. It is now ascertained that it occurs, although infrequently, after adult age. The name essential paralysis implies the absence of anatomical characters. It seems to have been well established that the seat of the paralytic affection is the anterior gray substance of the spinal cord, and that the nature of the affection is inflammatory. This pathological view is expressed by the names, myelitis of the anterior horns and poliomyelitis. In a large majority of cases the disease, as occurring in infancy, is acute. The diagnosis and treatment in these cases will be considered under the name acute infantile spinal paralysis, and, afterward, will be noticed inflammation of the motor tract of the spinal cord as occurring in the adult, in an acute, a subacute, and a chronic form.

Acute Infantile Spinal Paralysis.

Children between one year and four years of age are the subjects of this affection. It begins with a febrile attack which is generally without prodromes or any apparent causation. In a case occurring in the author's practice, the attack was in the night, the child at bed-time having been apparently in perfect health. The fever varies considerably in its intensity in different cases; but the range of temperature, and the average, in a considerable number of cases, remain to be ascertained. More or less increase of temperature is very rarely, if ever, wanting. The fever is accompanied by head-symptoms which are usually prominent, namely, delirium, somnolence, coma, and sometimes convulsions. Different cases differ as regards the occurrence or the prominence, severally, of these and other symptoms denoting cerebral disturbance. There are manifestations of pain in the back and limbs. The fever is of short duration. It may continue only a few hours. It is usually limited to one or two days, but, exceptionally, its continuance is for a week or longer. The affection is hardly determinable in this stage. It may, naturally enough, be considered a febricula; indeed, there is room for the inquiry, whether the disease be not primarily an essential fever of which the myelitis is a complication. It is not easy to reconcile the symptoms at the outset with the assumption that they are purely symptomatic of myelitic inflammation.

Paralysis is discovered after the fever, together with the other prominent symptoms, have subsided, and apparently convalescence is about to take place. The muscles of both lower limbs are affected in most cases. Sometimes the paralysis is limited to one of the lower limbs. In some instances the muscles of the upper limbs and of the trunk are involved. Cases of paralysis of one upper and one lower limb on the same side, and on opposite sides, have been observed. The paralysis not infrequently is limited to certain of the muscles of the affected limbs, and generally the degree of paralysis is greater in some of the muscles than in others. The paralysis is developed rapidly, and within a brief period attains to its maximum. The paralyzed muscles are completely relaxed, and they are insusceptible to reflex excitation. They speedily cease to contract from excitation by the faradic current, while their excitability to the galvanic current remains, and is often increased. The temperature of the paralyzed limbs is often considerably lowered. The motor paralysis is generally unaccompanied by anæsthesia, and sensation is impaired slightly, if at all.

The paralysis remains stationary for a period which is sometimes very brief—a few days only—but generally for several weeks, when it commences to decrease. A characteristic feature is a progressive improvement manifested in some of the paralyzed muscles and not in others. Complete recovery may take place after the lapse of several months. Often, however, a greater or less number of the affected muscles remain permanently paralyzed. The persistent paralysis may be limited to one limb, to a portion of the limbs, or to particular muscles. The muscles which do not manifest improvement speedily become atrophied. The atrophy is progressive, and the muscular structure may in the end almost entirely disappear. This atrophic change is a diagnostic feature. The surface over the atrophied muscles is cold and cyanotic.

The unfavorable progress, as regards the paralytic affection, is compatible with perfect health in respect of the vital functions. The disease has no tendency to destroy life. It leads, however, to a variety of deformities produced by arrested growth of the paralyzed limbs, absorption of the cartilages within the joints, and the contraction of muscles which are less paralyzed than those by which they are normally antagonized. The instances of shortened and wasted limbs, as well as a certain proportion of the cases of the different varieties of club foot, which often fall under observation, are deformities having their origin in this disease.

The clinical characteristics of the disease render its discrimination from other paralytical affections easy. Enumerating the more important of these characteristics, they are the age, the initial fever of brief duration, the not infrequent lack of symmetry in the localization of the paralytic manifestations, the inequality in the degree of the paralysis of the different muscles of the affected limbs, or its limitation to a few muscles, the absence of anæsthesia, the notable atrophy of the muscles which remain paralyzed, and the resulting deformities.

Treatment of Acute Infantile Paralysis.

Were the affection recognized in the initial or febrile stage, the objects of treatment would be the arrest of the myelitis, and the prevention of the lesions which render permanent the paralysis of more or less of the muscles affected. Owing, however, to the fact that the diagnosis is not made until this stage is passed, nothing can be said, based on clinical experience, of the efficacy of therapeutical measures employed for these bjects. Regarding the disease as primarily and essentially a local nflammation (which admits of doubt), the rational indications are the ame as in the form of acute myelitis which has been considered.

After paralysis has taken place, the objects relate to its persistency, trophy of the muscles, and the resulting deformities. That the ocurrence of paralysis is not proof of permanent lesions of the cord, is shown by the fact that a certain proportion of cases end in complete recovery. It is desirable to prevent the progress of lesions to a degree which involves their permanency, and, consequently, renders recovery impossible. If there be therapeutical means for this end, their efficacy is yet to be ascertained. Rationally considered, complete rest is as important in this as in any other of the inflammatory affections of the cord; a certain amount of counter-irritation over the spine is advisable, and the symptomatic indications in particular cases are to be adequately met. Galvanism, applied directly to the spine, ergot, and belladonna are recommended. Clinical data for judging of the value of these, as of other remedies, are, at present, insufficient.

Measures addressed to the paralyzed muscles with a view to prevent, or retard atrophic degeneration, are important. Faradic electricity may be used, provided the muscles are thereby excited to action. Galvanism is more effective, inasmuch as the muscles respond to this current when they are insusceptible to the former. Friction, kneading, and passive movements of the muscles should be methodically and persistently employed. Experience seems to have demonstrated the inutility of strychnia.

The treatment of the deformities following infantile paralysis, belongs to orthopædic surgery.

INFLAMMATION OF THE MOTOR TRACT IN THE ADULT.

The disease in the adult may be acute, subacute, or chronic. In the acute form, it differs from the infantile paralysis chiefly in the less degree of prominence of the cerebral and constitutional symptoms. Erb states with regard to the comparison as follows: "When this malady attacks adults, we have essentially the same picture of disease presented to us as in children. It is merely modified in a non-essential manner by the fact that the brain of the adult offers more resistance to the initial disturbances, that the general organism is not so highly disposed to fever, that the growth of the bones is already completed, and the firmness of the joints is greater." The following account is quoted from Prof. Seguin's paper, already referred to (page 561), which contains the histories of twenty-two cases of the disease in the adult: "This resembles infantile spinal paralysis in the most wonderful way; the symptoms of general systemic disturbance being much more marked in the young child (fever, delirium, convulsions). In each class of subjects the akinesis is developed in one or three days, it bears the same characters (with early loss of electro-muscular reaction), and affects the same muscles. . . . The acute spinal palsy of adults, when developed in one day, may bear a resemblance to hæmatomyelia (hemorrhage into the spinal cord), to softening of the spinal cord, or to central myelitis (localized or diffused). From hæmatomyelia the diagnosis is to be made by the absence of great anæsthesia, and the escape of the bladder and sphincter ani from palsy. Besides, hæmatomyelia produces symptoms almost or quite *suddenly*, whereas the symptoms of the acute form of myelitis we are studying appear in a *rapid* way. Softening of the cord and central myelitis give us anæsthesia, bladder-palsy, spasms in the paralyzed parts (spinal *epilepsy*) even at a quite early stage."

The following abstracts from Prof. Seguin's paper give the diagnostic points in the subacute and chronic forms: "In a few days an important element in diagnosis appears in the shape of loss of electro-muscular contractility (to faradism) in the weakest muscles of the patient with spinal paralysis. The atrophy soon following makes the diagnosis sure." This statement applies to the discrimination from paralysis attributed to spinal congestion. "There is an affection running its course in from ten to twenty days, characterized by symptoms almost identical with those of subacute spinal palsy. There is akinesis, without much anæsthesia, first appearing in the feet and legs, then ascending and involving the entire trunk and limbs, producing in nearly all cases death by asphyxia. It is upon this palsy of the respiratory muscles that the diagnosis of acute ascending paralysis (*vide* page 550) is to be made from spinal paralysis. In some of the more recently observed cases of ascending paralysis, the muscles were found to have lost their electro-muscular reaction at a very early day. The absence of anæsthesia, of bed sores, of vesical and rectal palsy, of spasmodic movements in the paralyzed parts, will serve to distinguish spinal paralysis from subacute localized myelitis, and from the effects of tumors upon the spinal cord. In the last-named forms of paralysis the muscular irritability is retained or exaggerated."

"Cases of subacute spinal paralysis which merit the designation chronic, resemble in many ways progressive muscular atrophy; the appearance of the patient may be very deceptive. In true progressive muscular atrophy, however, there are no paralytic symptoms in the strict sense of the word; the loss of power coincides with the wasting of the muscular substance; in spinal paralysis, weakness, even in the most chronic cases, is more prominent than atrophy. In progressive muscular atrophy the wasting affects portions of muscles, and never muscular groups as in spinal palsy. The electro-muscular contractility is preserved in the muscles which are the seat of disorganization in progressive muscular atrophy as long as any healthy muscular fibres remain; we see one-half of a muscle responding to the faradic current, while the other half shows no reaction. In spinal paralysis the muscles lose their reaction to faradism in groups, and do so before much wasting is apparent. Again, progressive muscular atrophy is strangely apt to strike homologous parts; the arms and thighs wasting simultaneously, or the legs and forearms, or the upper thigh and hip at the same time as the shoulders. Fibrillary contractions are very often present in the wasting muscles of patients with progressive muscular atrophy; rarely in chronic and subacute spinal paralysis. Lastly, the course of true progressive muscular atrophy is very much more chronic than that of any form of spinal paralysis."

In amyotrophic lateral sclerosis (*vide* page 552), in contrast with the affection under consideration, there is paralysis of the lower limbs without atrophy, the affected muscles are more or less rigid, contractures occur, and the reflex action of tendons is marked.

Cases of subacute and chronic inflammation of the motor tract present a larger proportion in which recovery from the paralysis is complete than those of the acute form of the disease; and, in cases not ending in complete recovery, the degree of improvement is greater. The duration of the disease in the cases which eventually end in recovery, is apt to be long, sometimes embracing several years. Permanent atrophy of a greater or less number of muscles is the result in a considerable number of cases. Death from the disease is extremely rare. When this result takes place, it is due to the muscles of respiration becoming involved, the immediate cause of death being apnœa.

Treatment of Inflammation of the Motor Tract of the Spinal Cord in the Adult.

The therapeutical indications are essentially the same in the acute, and in the early part of the subacute, form of the disease, as in infantile spinal paralysis. In the chronic form, "the treatment resolves itself into attempts to restore the nutrition and force of the muscles. This is done, as in infantile spinal paralysis, by means of the galvanic current applied in such a way as to produce muscular contractions. When improvement takes place, the muscles reacquire the property of contracting to faradism, and this agent should then be substituted for galvanism."[1]

LOCOMOTOR ATAXIA.

There is an anatomical propriety in placing the affection just considered and locomotor ataxia in juxtaposition; in the former the anterior, and in the latter the posterior, portion of the spinal cord is the seat of disease. Locomotor ataxia is symptomatic of the pathological change known as gray degeneration or sclerosis of the posterior columns. The lesion, and, consequently, the symptoms, are bilateral. As a rule, the lesion is especially marked in the dorsal and the upper lumbar section of the cord. In a lesser degree it frequently exists throughout the whole length of the cord, and it may extend to the restiform bodies of the medulla oblongata. The gray posterior horns are often involved, and it is held by Lockhart Clark that this is so constant as to render pertinent the inquiry whether the lesion be not here primarily seated. The fact that spinal paralysis is not infrequently associated with ataxia is explained by the extension of the lesion to the lateral columns, and, in some instances, to the anterior gray horns. Most pathologists hold the opinion that the lesion is the result of a chronic inflammation (myelitis). The name *tabes dorsalis*, formerly used to embrace affections among which ataxia was included, is preferred by some writers to the latter term. The prefix progressive is objectionable on the ground that it conveys an error if the word be understood as implying that the disease never ceases to progress. This is by no means true in a considerable proportion of cases. Moreover, the affection, regarded at least from a clinical standpoint, may not only remain stationary for an indefinite period, but it may be notably retrogressive, and complete recovery is possible.

Ataxia does not involve necessarily any diminution of sensibility or motor power. It is not, therefore, strictly a paralytic affection, using the term paralysis in its common acceptation. The disorder of motility, to which the term ataxia should be restricted, is manifested by inability to combine and direct muscular movements in the performance of voluntary acts; in other words, the difficulty is in co-ordinating the action of the muscles. The ability to co-ordinate movements by the will is acquired when infants have learned to grasp objects and to walk. It is capable of indefinite extension by means of education and practice. The incoordinate movements in this affection differ from those which are spasmodic or convulsive, in the fact that they are altogether voluntary, whereas in the latter they are involuntary. The movements in ataxia are produced by the will, but are not completely under its control.

---

[1] Seguin, op cit.

In the great majority of cases, ataxia is paraplegic, affecting the lower extremities. If there be considerable disorder of the faculty of co-ordination, the diagnostic features are readily recognized by the so-called ataxic gait. The limbs are thrown forward in an irregular jerking manner, as if at random, instead of with precision. The feet strike the ground forcibly. The patient endeavors to guide the movements with the eyes, and walks with much greater difficulty, or, perhaps, is unable to walk, if the eyes be closed or turned in another direction. The countenance shows anxiety and a laborious effort in walking. The contrast with the paralytic gait is sufficiently striking. The same features, less marked, are observable if the degree of ataxia be moderate or slight. In an extreme degree of the affection the patient is unable to walk, and is confined to the bed or chair.

An extreme degree of ataxia may be wholly unaccompanied by motor paralysis. Lying upon the bed, or in a sitting posture, the limbs may be projected with force. If the limbs be extended, the patient may be able to oppose an insurmountable resistance if the attempt be made to bend them. It is easy to determine by these simple methods that there is no deficiency of motor power. Frequently, however, more or less paralysis is associated with the ataxia. By the same methods the relative proportion of the former is determined accurately enough for practical purposes. It is obvious that the characters of the ataxic gait are the less manifested the greater the amount of associated paralysis. A common test, and a good one, of the existence of ataxia, is inability to stand with the heels in apposition and the eyes closed; the body reels, and the patient would fall if not supported. The instances in which this test is fallacious are extremely rare.

Cutaneous and muscular sensibility are frequently, but not constantly, diminished in cases of ataxia. Reflex excitablity through the skin presents no more variations than are found in different healthy persons. The reflex movements excited by percussion of the tendons, however, are often wanting. Striking the tendon just below the patella does not cause the jerking upward movement of the leg as in health. The electro-muscular contractility (faradic and galvanic) furnishes no diagnostic characters. Contraction of the pupils (myosis) is an occasional symptom, and in some cases one pupil is contracted and the other dilated. Paralysis of certain of the intra-orbital muscles, especially the motor oculi and abducens, occurs in some cases, giving rise to strabismus and diplopia. These paralytic complications are temporary, sometimes disappearing and recurring, but in some instances becoming permanent. The ataxia in some rare instances affects the muscles of the eye, causing a nystagmus, which is peculiar in the fact that the irregular movements are voluntary. A much graver complication is atrophy of the optic nerve and disk, which sometimes rapidly (weeks), and sometimes very slowly (years), progresses, causing in the end complete amaurosis. Happily this occurs in only a small proportion of cases. Erb noted it in eight out of about seventy cases. More or less impairment of the sexual function, preceded perhaps by an abnormal excitability, is the rule, and impotence is frequent. The psychical functions remain intact, and this fact, together with the absence of any cerebral symptoms, excludes intra-cranial affections. The degree of ataxia, however, is temporarily much increased by mental excitement. A patient moderately ataxic stated that he found it necessary to avoid crossing a street if any vehicles were near; for, under the idea that he must hasten his steps to avoid danger, he was utterly unable to walk. The author is accustomed to arrange a foot race for paralytic and ataxic patients, of course with their co-operation, in order to illustrate the diagnostic characters of gait, and, also, to enliven somewhat the tedium of clinical teaching. On one occasion a moderately ataxic patient was pitted against one with a considerable degree of paraplegic paralysis. The match seemed very unequal, but under the excitement of the occasion the ataxic patient was unable to move before his competitor had made considerable progress, and the latter came out ahead. Repetitions of the foot races on successive years have served to illustrate the improvement which may have taken place. The paraplegic and the ataxic patient just referred to, after the lapse of a year, were again matched to show that the latter had improved notably, while the condition of the former had been stationary. After another year, the two cases still remaining in hospital, the ataxic patient had improved to such a degree that a case of paraplegic paralysis could not be found with whom he could be fairly matched.

Difficulty in the diagnosis of ataxia relates exclusively to the incipiency of the affection, and its early recognition is of much practical importance in regard to treatment. The development of the affection is generally slow; many months or even years may elapse after the primary or precursory symptoms have appeared, before the diagnostic features pertaining to motility are well marked. One of the earliest of the symptoms has not, as yet, been mentioned, namely, neuralgic pains in the limbs. These are characteristic. They occur in irregular paroxysms, and are described by patients as darting, shooting, or lancinating in character. Patients are apt to compare them to an electric current. At different times they are felt in different parts of the lower limbs. Their severity may be extremely great, or they are comparatively slight. They may recur after long or short intervals. These pains have much diagnostic significance, taken in connection with other disturbances of sensibility (paræsthesia), a sense of insecurity in walking, difficulty of walking in the dark, of standing firmly with the eyes closed, and an awkwardness in the movements of the limbs, before the striking characters of the ataxic gait are manifested. The development of the affection is to be inferred from the foregoing symptoms, especially when, by testing the strength of the muscles, their motor power is found not to be impaired.

Amblyopia may occur at this early period, from commencing atrophy of the optic nerve, and diplopia from paralysis of intra-orbital muscles, the latter symptom being usually transitory. Irritability and weakness of the sexual organs are common at this stage.

The exclusion of paraplegic paralysis in making the diagnosis is easy. The differential points have been sufficiently considered. Nor is it difficult, when paralysis and ataxia are combined, to determine this fact, and to estimate the relative proportion of each. Other affections to be excluded are general cerebral paralysis, and disease of the cerebellum. In the former of these, the disorder of motility is purely paralytic, unless, as happens not infrequently, the paralysis is associated with ataxia. The cerebral symptoms which belong to it are not embraced in the clinical history of ataxia, and their absence suffice for its exclusion. In certain cases of disease of the cerebellum, the difficulty, as regards motility, is due to vertigo. The gait resembles that of a drunken man, and the rationale is analogous. Moreover, there are other symptoms pointing to an intra-cranial affection.

Ataxia may progress in extent as well as in degree, affecting both the upper and the lower limbs. The inco-ordinate movements of the upper limbs are distinguished from the tremor in paralysis agitans, and in multiple sclerosis, by the fact that they are in no sense automatic or involuntary, as in these affections. This fact holds true, also, of the movements in chorea. The choreic movements may be excited by volition, but they are more or less independent of the will. In ataxia the movements are wholly volitional; they are produced and maintained by the will alone, although but partially, or not at all, under its guidance. In rare cases the manifestations of ataxia appear in the movements of the body and neck, of the muscles concerned in articulation, in those of the face, and, as already stated, in a peculiar species of nystagmus. Exceptionally the affection commences in the upper extremities.

The prognosis in cases of locomotor ataxia is favorable as regards a tendency to death. The affection in itself does not prove fatal, even when involving, from its degree and extent, complete helplessness. Notable paralysis occurs in fatal cases, giving rise to bed sores and cystitis, the latter complications tending to destroy life. The great majority of patients die of some intercurrent disease, which has no direct pathological connection with the ataxia. The progress of the affection is usually extremely slow, and often, having reached a certain degree, it remains stationary for many years, or even during the natural duration of life. Not infrequently there is more or less improvement, and this is sometimes marked. In a hospital case under the author's observation, the patient for many months having been confined to the bed, the improvement was such that at the time of his discharge he was able to walk without great difficulty. Recovery has been known to have taken place, the affection having made but little progress. The author has not observed any instance of complete recovery, and the probability of this termination is so small, that the practitioner has no right to expect it in any given case; but it is a fact to be borne in mind that cases have recovered in which the progress of the affection was sufficient to render the diagnosis positive.

Treatment of Locomotor Ataxia.

The objects to be hoped for in treating this affection are the non-progression of the spinal lesion, and more or less improvement of the ataxic condition. Causal indications are to be sought after. The etiology is at present obscure; but there is ground for the belief that sexual excesses, in some cases, are causative. Complete reform in this respect is therefore important. Other excesses, including the immoderate use of tobacco, play the part of accessory causes, or, at least, increase the ataxic manifestations. Sanitary reforms and hygienic measures for the improvement of the general health constitute the most important part of the treatment. Over-exercise of the muscles is to be avoided; exercise should not be carried to the extent of producing much fatigue. The opinions of writers are generally agreed as to the inutility of antiphlogistic measures and the severe methods of counter-irritation. Sinapisms, liniments, and the application of dry cups, are useful in relieving the neuralgic pains which are apt to accompany the disease. German writers appear to be nearly unanimous in the conclusion that simple thermal baths are useless, if not injurious. Saline baths of moderate temperature seem to be useful in some cases. Sponging the body with cool, not cold, water, is recommended. The wet pack is of doubtful utility. Sulphur baths were thought to be highly useful by Trousseau, and their use is recommended by others. Among the remedies which clinical experience has shown to exert sometimes, to a certain extent, a curative influence, are electricity, the salts of silver and phosphorus. The galvanic current in the hands of Erb, was more or less beneficial in 41 of 66 cases. Beard and Rockwell have found galvanization of the spine and of the cervical sympathetic, central galvanization, general and peripheral faradization, useful, the selections and combinations, together with the strength of the currents, to be made according to circumstances in particular cases. For details respecting the electrical treatment the reader is referred to the works of those authors which have been repeatedly cited in the foregoing pages.

The nitrate of silver, advocated by Wunderlich as a remedy of marked curative power, is considered as often useful by Charcot, Vulpian, and others who have had large opportunities for observation. The author cannot speak of this remedy from his own clinical experience. The benefit to be hoped for from it is not sufficient to warrant its continuance so as to incur risk of a permanent discoloration of the skin, and the practitioner will do well to follow Bartholow's prudential injunction not to use it continuously for a longer period than six weeks. From a sixth to a third of a grain may be given three or four times daily. The oxide of silver has been found useful in some cases in which the nitrate was without effect. Dr. A. McLane Hamilton recommends the phosphate of silver, in one-third of a grain dose, instead of the nitrate.

Of the apparent value of phosphorus the author can speak from personal observation. This remedy has seemed to be decidedly useful. The form in which he has observed its use most frequently is the phosphide of zinc. He has also used it in oleaginous solution and in the syrup of the hypophosphites. It is difficult, especially in hospitals, to isolate the effects of remedies from hygienic influences. For a large proportion of hospital patients the conditions are vastly better, in a sanitary point of view, than before admission. Many of the causes of disease, namely, intemperance, sexual excesses, exposure, insufficient diet, and over-work, cease to be operative when the patient enters a well-regulated hospital. To separate from the agency of favor able conditions in these regards the effects of remedies, is not easy. Moreover, in ataxic cases electrical treatment has generally been conjoined with the use of medicinal remedies. A case in private practice under the author's observation for many years, has repeatedly afforded evidence of the usefulness of phosphorus. The affection in this case has made but little progress, but the ataxic manifestations have varied considerably at different periods. Whenever they have been increased, speedy improvement has taken place under the use of the phosphide of zinc. This may be considered as evidence that the degree of ataxia depends more or less on circumstances which are accessory to the spinal lesion, and that the remedy causes improvement by affecting favorably these circumstances rather than the lesion. The usefulness of other remedies is perhaps to be explained in the same way.

Other remedies which are recommended are the chloride of barium, the iodide of potassium, and strychnia. The chloride of barium is advised by Hammond in doses of three-fourths of a grain three times daily. The iodide of potassium is indicated if there be reason to suspect that syphilis enters into the etiology. Opinions differ as to strychnia. It is considered by some useful, and by others injurious. Whatever benefit may be derived from it probably proceeds from its action as a simple tonic remedy.

The lancinating pains which in some cases occasion great suffering, claim palliative treatment. Electricity, anodyne liniments, and the bromides, may afford relief; but opium cannot always be dispensed with. Gastralgia, with vomiting, and attacks which resemble nephritic colic, in some cases furnish symptomatic indications for opium.

VIII.

CEREBRO-SPINAL PARALYSES.

CEREBRO-SPINAL SCLEROSIS. PARALYSIS AGITANS.

Two paralytic affections are embraced under this heading, namely, paralysis from multiple sclerosis of the brain and spinal cord, and paralysis agitans. This collocation of these affections is appropriate from the fact that they both involve the cerebro-spinal system; in other words, they are not limited exclusively to either the brain or spinal cord; and, further, the diagnosis of each is to be based on its differentiation from the other. The two affections were formerly confounded, and it is only within a recent period that their differential characters have been clearly defined. In treating of them with reference to the diagnosis, the points of analogy and of contrast pertaining to the clinical history will chiefly claim attention; both are discriminated without difficulty from other affections.

CEREBRO-SPINAL SCLEROSIS.

Other names of this affection are, multiple sclerosis of the brain and spinal cord; nodular, disseminated, or insulated sclerosis. By French writers it is called *sclérose en plaques disséminées.* Anatomically it is characterized by the existence of nodules in the brain and spinal cord (interstitial myelitis and encephalitis). They may exist in the white or gray substance, and they are sometimes found in the roots and trunks of the nerves. They vary in size from a minuteness requiring the microscope to discover them, to that of a hazel-nut. In number they are variable. Many hundreds are sometimes observed. It is easy to understand that the pathological effects must vary widely in different cases according to the size, the number, and the situations of the nodules. The variations in these regards occasion a great diversity in the symptomatic manifestations. Cases differ in respect of the degree and extent of the paralysis; contractures occur frequently, but not invariably; jerking movements are sometimes observed; ataxic disorder exists in some instances; disturbances of speech may be present or wanting; general sensibility is either intact or more or less affected, the same being true of the special senses; the mental faculties remain sometimes unaffected, and they are sometimes more or less impaired. Notwithstanding these diversities, rendering the affection, as Charcot terms it, polymorphous, there are diagnostic features by which it may generally be recognized without difficulty.

A diagnostic point pertains to age. The majority of patients are between thirty and forty years of age when the affection begins. No period of life, however, is absolutely exempt. The incipient phenomena may proceed from either the brain or the spinal cord. Those of the former class are vertigo, cephalalgia, disorder of speech, impairment of vision, and mental disturbance. Those of the latter class are weakness of the limbs, with perhaps diminished or perverted sensibility, and sometimes lack of co-ordinating power. Generally symptoms of one or both of these classes precede for a considerable, or it may be for a long, period the occurrence of distinct paralysis. The paralysis commences much oftener in the lower than the upper limbs, and it is generally at first unilateral, becoming after a time bilateral. The upper limbs are rarely paralyzed in the same degree as the lower. The degree and extent of paralysis vary much during the progress of the affection in different cases. Contractures occur much oftener in the lower than in the upper limbs. Not infrequently the permanent contraction of muscles is such as to render the limbs rigidly fixed in an abnormal position; the knees closely approximated, and the thighs or the legs firmly flexed in some cases. The electrical and the reflex excitability of the muscles are usually retained for a long period, but eventually they may be notably diminished. The susceptibility to percussion of the tendons is increased. As regards sensibility, co-ordinating power, and the condition of the sphincters, different cases differ, and there may be notable differences in the same case at different periods in the progress of the affection.

The distinctive feature pertaining to the affected muscles is tremor. The diagnosis hinges on this symptom. The tremor is exclusively or chiefly incident to the excitation of the muscles by the will; hence it is distinguished as "volitional tremor." Coincident with the action of the muscles excited by the will, are oscillatory movements, rhythmical, and having a considerable range. Although their occurrence is determinable by the action of the will, they are not under its control; they are, therefore, automatic or spasmodic. They interfere with the performance of voluntary acts, and the patient is unable to suspend them by an effort of volition. After continuing for a time they cease, and, as a rule, there is no tremor during sleep or in the absence of any mental excitation. This characteristic symptom differs from the tremor in cases of paralysis agitans, in the fact that it is manifested in connection with volition. It differs from the inco-ordinate movements in cases of ataxia, in the fact that, although produced by the will, the movements are automatic. It differs from the irregular movements in chorea, in its rhythmical character, and also in the fact that in chorea the spasmodic movements occur without, as well as with, the exercise of volition.

Tremor, with the foregoing distinctive characters, not preceding but accompanying paralysis, is pathognomonic of multiple sclerosis. Existing in a marked degree in all the limbs, extending to the head, and even over the whole body, it renders the condition of the patient perfectly helpless. This symptom is present in the great majority of cases, but instances have been reported in which it was absent. It may disappear in an advanced stage of the disease. The speech is often affected. Words are uttered in a monotonous, feeble, drawling tone, and, as in a case under the author's observation, the patient may be able to speak only in an almost inaudible whisper. The disturbance of speech cannot be confounded with aphasia or the difficulty dependent on paralysis or ataxia of the muscles of articulation. The source of the disturbance is a paretic condition of the vocal cords. The lips and tongue are in some cases moved with difficulty, and are tremulous. The respirations may be weakened, so that expectoration is extremely difficult. Nystagmus is a very frequent symptom. Impairment of vision is not infrequent, either with or without ophthalmoscopic appearances denoting atrophy of the optic nerve. Attacks resembling apoplexy (apoplectiform) occur in a small proportion of cases. They are accompanied by considerable or high fever, and hemiplegia. In some instances they prove fatal, but, as a rule, recovery of consciousness, with cessation of fever, takes place after two or three days, and the hemiplegia slowly disappears. In some cases these attacks recur many times. The mental faculties, in most cases, deteriorate in a greater or less degree. The clinical history in this respect may be that of general cerebral paralysis. The existence of the affection, however, in a very marked degree, is not incompatible with the full possession of the intellectual powers. This fact was exemplified in a case to be presently introduced. From the absence of all symptoms denoting a cerebral affection, it may be inferred that the sclerosis is seated chiefly, or, perhaps, exclusively, in the spinal cord.

The differential characters of cerebro-spinal sclerosis, as contrasted with paralysis agitans, if well marked, are sufficiently distinctive; but, in certain cases, conjoined with the tremor characteristic of the former, is the trembling which belongs to the latter affection. In paralysis agitans the trembling movements are rhythmical, but shorter, and they are independent of volition, occurring when the muscles, as far as voluntary action is concerned, are at rest. Now, in some cases of sclerosis, tremor occurs without acts of the will, especially when the patient experiences mental emotions, and it may become continuous, resembling in all respects that of paralysis agitans. The most rational explanation of the coincidence of the two kinds of tremor is that the two affections are actually combined. In these cases the diagnostic characters of sclerosis do not lose any of their significance, but, for the best of reasons, paralysis agitans cannot be excluded.

Cerebro-spinal sclerosis continues indefinitely without terminating fatally. Its duration may extend from twenty to thirty years. It is not incompatible with good appetite, digestion, and nutrition for a long period. Death sometimes takes place in apoplectiform attacks. If these do not destroy life, and the patient be not taken off by some intercurrent disease, a fatal result may be attributable to the events incident to spinal or general paralysis, namely, cystitis and bed-sores, or to interference with the respiratory function.

The following account of a case presents points of interest; but it is to be borne in mind that, owing to the diversities which have been alluded to, no single case is typical except as regards the symptoms which are diagnostic of the affection.

The case was under the author's observation for two years. The disease had existed for about twenty years, and for about fifteen years the patient had, for the most part, kept within doors. His days were passed in an easy chair, and he had become habituated to a particular spot in one room, which he was seldom persuaded to leave. He was about seventy years of age. His education and intellectual endowments were of a high order. Prior to his illness he had mingled in the turmoil of politics, leading also a life of luxury and dissipation. Every exertion of the will directed to the upper limbs occasioned oscillatory movements, often with considerable force, which he was unable to arrest. The movements were instantly arrested when a hand was placed upon the limbs, and even by the motion of the hand toward the oscillating limbs without contact. He could neither walk nor stand without support, and he was unable to perform with the upper extremities any voluntary act, such as carrying food or drink to the mouth, using his handkerchief, etc., being entirely dependent on the services of others, which, fortunately for himself, he was able to command. He spoke only in a whisper, which was often so weak that it was difficult to make himself understood. There was no habitual disturbance of respiration, but a slight cold caused dyspnœa, and the act of expectoration was attended with much difficulty. The movements of the tongue and lips were unaffected. His intellect was intact. His memory being good, and keeping himself *au courant* with passing events, his conversation was such as might be expected from a man of large information and superior abilities. He never appeared to suffer from mental depression. His appetite, digestion, and nutrition were excellent, and he continued to indulge, without much restriction, in the pleasures of the table, "dining sumptuously" every day. The fingers and thumb of each hand were habitually in the position in which a pen is usually held, but without any rigid muscular contraction. Death took place suddenly and unexpectedly during an effort at stool.

One object in giving a sketch of this case is to state the apparent effect of medicinal treatment. At the first consultation, the phosphide of zinc, in doses of a tenth of a grain, was suggested, but without the expectation that this, or any remedy, would prove beneficial. Distinct improvement, as shown by greater strength of whisper, less tremor, and the ability to stand alone, took place under the use of this remedy, so that, unexpectedly, much credit was accorded for the treatment. That the benefit was not due to any mental influence was proven by the fact that, during the period of two years, the remedy was repeatedly suspended for a time and another substituted, the result being always a return to the condition before the remedy had been given. The improvement, although distinct, was not progressive; it reached a certain point, and was then stationary.

Festination was a feature in the early history of this case. On one occasion the patient felt it incumbent upon him to attend a public funeral, and he undertook to walk the length of the aisle of the church. He was obliged to take a running gait, the incongruity of which excited much surprise.

Treatment of Cerebro-spinal Sclerosis.

Complete recovery from this affection probably never takes place. The utmost to be hoped for is more or less improvement, and that the lesions will not increase. Fluctuations in the symptoms, during the course of the disease, occur irrespective of treatment; and, inasmuch as the essential lesions doubtless do not decrease, the inference is that the symptomatic manifestations depend much on accessory conditions. Whatever benefit may be derived from treatment, is, probably, due to favorable influences upon these accessory conditions which, as regards their character, are not always appreciable. To place the patient as far as possible under the best hygienic circumstances, and to improve, to the utmost extent possible, the general health, are objects of primary importance, and, in fact, they embrace the chief measures of treatment. By these measures, which will vary in different cases, and need not be here detailed, the accessory conditions, etiological and pathological, may be reached and favorably influenced.

In the way of medication, the phosphide of zinc was apparently beneficial in the case just sketched. The author, however, is unable to cite other cases in which this remedy was useful. Cases have been reported in which the nitrate of silver and arsenic have been beneficial. Improvement has followed hydropathic and electrical treatment. Adopting as an explanation of the usefulness of therapeutic agencies, their influence, not on the lesions, but on accessory conditions, it is not difficult to account for the fact that, of different remedies, each may find its useful application in some, but not in other, cases, as well as for the fact that notable temporary improvement may take place irrespective of treatment.

Paralysis Agitans.

The name paralysis agitans or shaking palsy can properly be applied only to cases in which tremor is associated with paralysis. The affection is to be distinguished from senile trembling, from the tremor attributable to the abuse of tobacco, opium, and alcohol, and from that which belongs among the toxic effects of mercury. The absence of paralysis and the etiological circumstances render the exclusion of these easy. The diagnostic problem is to exclude multiple sclerosis of the brain and spinal cord. With our present knowledge this is not difficult, except in some cases in which the symptoms of both affections are present, probably owing to the two being actually in combination. It will suffice to state the differential points.

The tremor in paralysis agitans consists of rhythmical, short, and rapid muscular movements, generally without much force. Their range and strength are increased by mental excitement. They occur wholly without any action of the will, that is, they are primarily and purely involuntary. In most instances they cease during sleep. Manifested at first in the upper extremities, they are sometimes for a considerable period unilateral, eventually extending to the other limb. Not very infrequently the tremor affects the head, the movements being either nodding or rotatory. Trembling of the facial muscles is occasionally observed. The affection very rarely occurs under forty years of age. The paralysis is secondary to the tremor, the latter existing often for a considerable period before the muscles affected become paretic. The paralysis affects especially the extensor muscles.

The points in contrast which relate to multiple sclerosis are as follows: In this affection the tremor is coincident with or is secondary to the paralysis; the lower limbs are almost invariably first affected; the tremor is excited by the will, has a wider range, and is stronger; the affection occurs at an earlier period of life.

What are termed by German writers "compulsory movements," and particularly that form in which the patient is impelled to a running gait on attempting to walk, being able, perhaps, to maintain the former for a long time when the latter is impossible (festination), enter into the clinical history of paralysis agitans; but they are also observed in cases having the distinctive characters of multiple sclerosis.

These two affections are distinct from an anatomical as well as a clinical point of view. Paralysis agitans exists without the lesions which are characteristic of multiple sclerosis. In cases of the former, different morbid appearances have been found, and in some instances none have been discovered. The affection doubtless has its anatomical characteristics which are yet to be ascertained, and it is not certain whether the seat of the affection be in the cerebral or the spinal system, or in both. The affection resembles multiple sclerosis in the liability to similar contractions of the paralyzed muscles sometimes causing notable deformities. Another point of resemblance is in its long, indefinite duration. It may render life burthensome without apparently abridging it.

Treatment of Paralysis Agitans.

The prospect of effecting a cure in cases of this affection does not justify the physician in holding out to a patient expectation of recovery. What was stated in regard to the objects of the treatment of multiple sclerosis will alike apply to this affection. Isolated cases have been reported in which a great number of remedies have been apparently useful, namely, the carbonate of iron, the bromide of potassium, the chloride of barium, the bichloride of mercury, the nitrate of silver, the chloral hydrate, phosphorus, cod-liver oil, and the calabar bean. It is claimed that cures have been effected by electrical treatment. Beard and Rockwell state that central galvanization and general faradization by their general effects are beneficial, and that the best results have been obtained by galvanization of the spine and sympathetic and brain. The fact that, exceptionally, such a number of remedies have appeared to be useful, admits of several interpretations. The diagnosis may have been erroneous; improvement may have taken place under their use independently of any therapeutical effect; and, lastly, the affection may be dependent, in different cases, on a diversity of accessory circumstances. Palliation of the tremor may be obtained by opiates and other narcotics, *e. g.*, hyoscyamus, conium, and belladonna. The relief is, however, only temporary.

IX.

MYOPATHIC PARALYSES.

PROGRESSIVE MUSCULAR ATROPHY. PSEUDO-HYPERTROPHIC PARALYSIS.

PARALYTIC affections are myopathic when the paralysis depends on disease of the paralyzed muscles. Two important affections fall under this head, namely, progressive muscular atrophy and pseudo-hypertrophic paralysis. It may be questionable whether these affections are, strictly speaking, paralytic in character, but it is convenient to treat of them as such.

PROGRESSIVE MUSCULAR ATROPHY.

The impairment or loss of muscular power in this affection is secondary to, and proceeds from, atrophy of the affected muscles. This is an essential point of distinction from muscular atrophy which follows, and is an effect of paralysis. In the latter the atrophy, and in the former the paralysis, is primary. The diagnosis, therefore, involves the exclusion of the atrophy of muscles previously affected with paralysis. Other names by which the affection has been designated are wasting and creeping palsy. Anatomically, as regards the affected muscles, it is represented by more or less diminution of their volume. This diminution is in some instances extreme, but it is not always in proportion to the atrophic change, inasmuch as fibroid tissue and fatty granules may, in a measure, take the place of the muscular substance. As regards pathological character, the primary process within the affected muscles is probably inflammatory. The affection also represents, in some cases at least, histological changes in the anterior horns of the gray matter of the spinal cord. Whether these changes (involving, as conjectured, trophic cells) are primary or secondary, as regards the muscular atrophy, is a pathological question much discussed, and at present *sub judice*.

The diminished volume and power of the muscles involved in this affection are readily ascertained. It is only necessary for the diagnosis to exclude atrophy due to antecedent paralysis, mechanical pressure, or arrest of development. The attendant circumstances and the previous history generally render this easy. There are, however, certain points relating to the clinical history which are diagnostic. In the great majority of cases the first manifestations are in an upper extremity, oftener the right than the left. The interossei muscles and those of the ball of the thumb are especially the first to become atrophied; next the muscles of the shoulder, beginning generally with the deltoid. The muscles of the lower limbs are affected primarily in a much less proportion of cases, and those of the trunk still more infrequently. In rare instances, in children, the facial muscles are first affected. The affection may then simulate glosso-labial paralysis, but the tongue and the muscles of deglutition are not involved. Veritable glosso-labial paralysis, however, occurs in a certain proportion of cases in the progress of the affection. In most cases the affection becomes bilateral and symmetrical, that is, the atrophy extends over corresponding muscles on the two sides. The correspondence is sometimes exact as regards the degree of atrophy, but oftener there is more or less disparity in this respect.

Patients in whom the affection has made much progress present a striking spectacle. The muscles of the shoulder, hands, and feet may become so attenuated that the bones seem to be covered by integument alone. The contrast with parts of the body in which the muscles retain their normal volume is remarkable. A patient who has for many years been under the author's observation is a man over six feet in height, whose muscular system was largely developed. The atrophy is limited to the muscles of the arm, thigh, and back, both sides being equally affected. The muscles of the forearms and the calves of the legs are in singular contrast with the diminutive size of the arms and thighs. In standing or walking the body is bent far backward; and, on raising and moving forward the upper extremities, the scapulæ are thrown outward from the chest, forming the wing-like projections which are characteristic of paralysis of the serratus magnus. In this case there has been no progress of the affection for the past six years. The picture in some cases is rendered still more striking by deformities arising from the action of muscles which antagonize those affected with atrophy. Among these deformities is the flexion of the fingers which gives an appearance resembling a bird's claw, and is called the "clawed hand" (*le main en grippe*).

A diagnostic feature is the appearance in the atrophied muscles of vermicular movements, due to the contraction separately of different groups of their component fibres (fibrillar contractions). These occur in connection with voluntary action of the muscles, but also spontaneously, and are increased by electrical excitation. The reaction to electricity—faradic and galvanic—is diminished in proportion to the degree and extent of atrophic change; and the impairment of voluntary power (paralysis) is proportionate thereto.

The term progressive, in the name of this affection, implies a tendency to continued progress. This is true of a certain proportion of cases. The atrophy may extend over nearly the whole of the voluntary muscular system, as in the case cited by Trousseau, in which the patient retained only the power of moving the head and the forefinger of one hand. Cases of an extreme degree and extent of atrophy, however, are rare. In not a few instances, after a certain amount of progress, it ceases either permanently or for an indefinite period. Limited to certain groups of muscles, the patient may suffer only from the impaired power of these, the general health being excellent. In the case just referred to which has been for several years under observation, the patient is perfectly well exclusive of the weakness in the affected portions of the muscular system. If progressive, the progress may be extremely slow, many years elapsing before it attains to a great extent. Death, in some cases, is hastened or caused by an extension of the atrophy to the muscles concerned in respiration, or by the occurrence of glosso-labial paralysis. Exclusive of these cases, owing to the long duration of the affection, the immediate cause of death is often some intercurrent disease.

Treatment of Progressive Muscular Atrophy.

The restoration of atrophied muscles to their normal condition is not an object of treatment. This cannot be effected. The objects which relate to the myopathic conditions are an arrest of progress and increase of the functional capacity of muscular fibres, within the affected muscles, which have undergone little or no atrophic change. Other objects, common to the treatment of all chronic diseases, are the removal, as far as possible, of unfavorable sanitary influences, and the utmost practicable improvement and maintenance of the general health. The latter object will embrace, in different cases, a variety of indications which have no special connection with the affection of the muscles. Effecting these objects, if the disease have made but little progress, recovery may be said to have taken place, albeit atrophy of more or less of muscular fibres must remain as a permanent lesion. As regards the treatment addressed to the muscles, there is no difference of opinion among those who have had the most experience. Reliance is almost exclusively upon electricity. The want of agreement relates only to the relative superiority of the faradic and the constant current. Trustworthy testimony establishes the value of each. The constant current is essential in some cases in which the muscles respond to this and not to the interrupted current. Beard and Rockwell employ both in the same case. In the selection or the combination, experience in each case is to be the guide. Eulenberg is emphatic in the statement that nothing is to be expected from internal remedies, as a warning lest their use may diminish the reliance on electricity and gymnastic treatment. The latter consists of active and passive movements, together with massage. That author attaches much importance to these.[1]

In connection with progressive muscular atrophy, a rare affection which has received several names may be referred to. The atrophy in this affection is confined to one side of the face, and involves not only the facial muscles, but other of the soft parts, and even the bones. *Progressive facial atrophy* is the simplest and best designation. The atrophy has its point of departure in the integument, which becomes discolored, the hairs of the beard, eyebrows, and the side of the head either turning white or falling out. As a rule, the sensibility of the skin remains intact. The subcutaneous adipose tissue progressively diminishes. The muscles generally, but not always, become involved in the atrophic process, but their contractility is well preserved. The cartilages and bones are diminished in size; and the atrophy may extend to the corresponding side of the tongue, palate, and uvula. The contrast which the two sides of the face offer, when the affection is advanced, is very striking. It cannot be confounded with facial paralysis, for the muscles are not paralyzed. In the small number of cases to be found in medical literature, women have been affected much oftener than men; the affection occurs in youth, and, in the great majority of cases, it is seated on the left side. It progresses very slowly. It may be unaccompanied by any symptoms of disease affecting either the centres or periphery of the nervous system. The general health may be excellent, and the affection involves no danger. Benefit has not been derived from treatment in the cases which have been reported.[2]

Pseudo-hypertrophic Paralysis.

The affection called pseudo-hypertrophic or myosclerotic paralysis is characterized by more or less diminution of muscular power, with usually an increase in volume of the muscles affected. The anatomical characteristics are increase of connective tissue, with generally an abnormal amount of fat, and atrophy of the muscular substance. Pathologically, it is considered to be a chronic inflammatory affection (myositis). Pathological questions at present under discussion are—whether the myopathic affection be primary or secondary to histological changes which have been observed in the spinal cord? and whether it be not essentially identical with progressive muscular atrophy? The scope of this work does not permit the consideration of these questions. The clinical account which will be given of this very rare affection is based chiefly on the results of the analytical study of eighty-five cases by Dr. C. T. Poore.[1] The quotations are from Dr. Poore's article.

---

[1] *Vide* Ziemssen's Cyclopædia, Am. ed., vol. xiv.

[2] For the description of a case by Prof. William H. Draper, and the important features in twelve cases collected from different sources, *vide* American Psychological Journal, February, 1876.

The affection occurs especially in childhood and youth. Of eighty-five cases, the ages were over sixteen years in only six, and in thirty-eight cases they were under five years. In no case was the age over forty. Muscular weakness in the lower limbs is the first symptom to excite observation. If the affection occur in early infancy the ability to walk is delayed, and the child may never walk. If it be developed in childhood, attention is first attracted to the "unsteady gait, easy fatigue, and frequent falls especially in running." "The difficulty in walking is due to a progressive loss of power in the muscles of the legs, buttocks, and back. Those affected with the disease, stand and walk with their feet widely separated, in order to give them a wider base of support. The lumbar curve is exaggerated, the upper portion of the body thrown backward, and the abdomen protruded, in order to enable them to keep their balance. Their mode of walking, even at an early period of the disease, is peculiar. With the feet widely separated, they throw their entire weight on one leg, with a lateral bending of the spine to that side; and then, with a jerk or hitch, swing the other leg, carrying the foot through the arc of a circle, with the toes pointing downward to a position in advance of the other. This manœuvre is repeated in advancing the other foot. This alternate balancing of the body gives these patients a very peculiar and characteristic gait." . . . "The manner in which they pull themselves up, as it were, from a sitting posture, or in getting up from the floor, shows how little strength there is in these muscles."

In conjunction with muscular weakness, the affected muscles are increased in size. The increase takes place without pain. The calves of the legs are especially apt to become notably enlarged. The enlargement commences after the waddling gait has been observed, within a period which varies from a few months to several years. "In those cases in which most of the muscles of the body have undergone this change, the appearance of the patient would indicate great strength, while, in truth, it is with the greatest difficulty that he can walk across a room. The enlarged muscles stand out prominently and are hard to the feel when contracted, but, when relaxed, are flabby and hard to define." In one case of those analyzed there was no increase in the size of the muscles. "The muscles of the calves were hard when contracted, but not enlarged. He had not been able to stand for eighteen months; and the pathological condition of the muscular tissue taken from the calves was similar to the same tissue taken from his brother, who showed all the marked symptoms of pseudo-hypertrophic paralysis."

Atrophy of certain muscles sometimes occurs in the progress of the affection. Thus, the thighs and arms may be reduced in size, the calves and forearms being increased, or the upper extremities may be wasted, while the lower are enlarged. There is often a condition of the foot resembling talipes equinus, with sometimes a tendency to varus. A claw-like bending of the toes is also often observed. If life be sufficiently prolonged, simple atrophy of the affected muscles may take the place of the pseudo-hypertrophic condition. Foster (*vide* essays on Medicine, chiefly clinical) gives a case in which, at the end of five years, the muscles were as much wasted as they had previously been enlarged, with almost complete loss of muscular power.

---

[1] *Vide* New York Medical Journal, June, 1875.

The progress of the affection in different cases is variable, without the strict observance of a law of symmetry. The gastrocnemii are almost invariably enlarged, and, of the muscles of the lower extremities, next in frequency the glutei are involved. Of the upper extremities, the deltoid and the scapular are the muscles oftenest affected; the temporals, the masseter, and the tongue, are sometimes enlarged. Muscles may be affected on one side and not on the other, or a muscle on one side may be enlarged, and the corresponding muscle on the other side be atrophied. There is no rule as to the distribution of the muscles affected. The affection is sometimes limited to a portion of a muscle. Hypertrophy of the heart was noted in four of eighty-five cases, and in a case reported by Foster, to which reference has been made, the hypertrophy occurred during three years while the patient was under observation.

The electrical susceptibility decreases in proportion to the destructive effect of the lesions on the muscular tissue. "Fibrillar contractions" are observed, but they are less marked than in cases of progressive atrophy.

The foregoing points in the clinical history suffice for the diagnosis. Certainty in the diagnosis may be obtained by procuring portions of tissue from within the enlarged muscles, adopting the method known as "harpooning," and submitting the portions thus procured to microscopical examination. This, however, is rarely necessary. A few cases have been recently reported of enlargement of muscles from pure hypertrophy; that is, from an increase of the muscular elements, which, in appearances and symptoms, resembled pseudo-hypertrophy. In one of these cases, the fact of a true hypertrophy was demonstrated by the microscopical examination of a portion of muscular substance obtained by means of the "harpoon." It is a question whether there are not cases of pseudo-hypertrophy in the initial stage. The cases reported are as yet too few for any deductions.[1]

The duration of the affection in the cases analyzed by Dr. Poore, varied from two to thirty years. In all the cases of which the termination is given (13), the immediate cause of death was some intercurrent affection.

Treatment of Pseudo-Hypertrophic Muscular Paralysis.

In this affection, as in progressive muscular atrophy, cure is not an object of treatment; all that can be hoped for is arrest, or, if this be not attained, slowness of progress. With our present limited knowledge of the affection, as regards the employment of therapeutic methods, the indications correspond to those in progressive muscular atrophy.

---

[1] *Vide* Eulenberg, in Ziemssen's Cyclopædia, Am. ed., vol. xvi.

Local Paralyses affecting Spinal Nerves.

Exclusive of paralysis from lead, the affections embraced in this division are those seated in the trunks or branches of nerves of spinal origin, not involving disease of either the cord or brain. They are, therefore, peripheral paralyses. For the sense of this term, and the circumstances which distinguish peripheral paralysis from those proceeding from centric disease, the reader is referred to the chapter introductory to this section (*vide* page 481). Inasmuch as different morbid conditions, seated at any point in the course of any of the numerous trunks and branches of spinal nerves, may give rise to paralysis, it is obvious that the number of paralytic affections in this division is large. It is unnecessary to consider them separately. The general principles of diagnosis and treatment are alike applicable to each.

In peripheral paralysis there is an obstruction of some kind situated somewhere in the course of spinal nerves between their centric connections and the paralyzed muscles. A complete diagnosis, in each case, requires knowledge of the muscles paralyzed, the particular nerve or nerves affected, the seat of the obstruction, and the obstructing cause.

Inability to perform movements which involve certain muscles, denotes their paralyzed condition. Distortions may be caused by the action of muscles which antagonize those paralyzed. Having determined that a local paralysis is not myopathic, and that it is peripheral, the affected nerves are those sending their terminal branches to the paralyzed muscles. Knowledge of the anatomico-physiological relations of the latter to motor nerves, is, therefore, the guide in the diagnosis.[1] Local paralyses, however, by no means involve always nerves separately, but often conjointly, so that different groups of muscles are paralyzed. The diversities thus arising from varied combinations are numerous.

The seat of the obstruction and the nature of the obstructing cause, are often evident. This part of the diagnosis is easy when paralysis follows wounds, contusions, dislocations, fractures, suppurations, etc., which, as is obvious from their situation, are liable to implicate certain nervous trunks. Neoplastic formations within nerves, included under the name neuromata, are discoverable if in situations which can be explored by the eye or the touch. The evidence is the presence of tumors, oval or rounded in form, and more or less movable in a lateral direction. But to determine the pathological character of a tumor may be difficult. These different causes produce obstruction by solution of continuity, compression, atrophy, and degenerative changes. Neuritis, acute or subacute, occurring either in connection with the foregoing affections, or independently of them, may give rise to local paralyses. This affection is to be inferred from certain symptoms which are diagnostic of inflammation of the nerves, namely, pain, intense in proportion as the inflammation is acute, tenderness over the affected nerve, in some instances a line of redness over the course of the nerve, various local perversions of sensibility, anæsthesia, an appreciable swelling of the nerve if it be accessible to the touch, cramps and contractures of the muscles to which the branches of the affected nerve are distributed, as well as in other muscles which become excited by reflex irritation—more or less of these symptoms preceding the paralysis. Finally, a local paralysis of a spinal, as of the facial, nerve, may follow exposure to cold, or occur under other circumstances, without the diagnostic symptoms of neuritis, and when the causative condition, with our present knowledge, must be considered as functional. A moderate mechanical pressure upon a nerve, continued for some hours, may occasion complete paralysis of temporary duration. An example is the paralysis affecting the musculo-spiral nerve, following profound sleep or alcoholic intoxication, during which the position of the trunk was such as to cause compression of this nerve. Cases of paralysis of the arm produced in this way, are not infrequent.

---

[1] For an account of the symptoms, etc., of paralyis affecting, respectively, the nerves of the upper and the lower extremities, together with paralysis of the cervical and the dorsal nerves, *vide* Treatise by Erb, in Ziemssen's Cyclopædia, Am. ed., vol. xi.

Treatment of Local Paralysis affecting Spinal Nerves.

The prognosis as regards recovery, or, if this be not possible, the degree of approximation thereto which is attainable, must vary in individual cases according to the nature and extent of the local causes of the paralysis. From the various traumatic causes result, in different cases, simple division of a nerve, the loss of a section greater or less in length, injury varying in amount without complete separation, and mere contusion. The bearing on the prognosis of these differences is obvious. Promotion of the union of the divided extremities by bringing them into apposition, and of the reproduction of the section which has been lost, the restoration from injury, and the prevention of suppuration or sloughing are objects of treatment with reference to the paralytical affection. If the paralysis be due to compression by any cause, the prognosis depends on the practicability of the latter being removed, and its removal is the object of treatment. A neuroma causing paralysis calls for excision, if the situation render this favorable, and the prognosis hinges on subsequent union and reproduction. Neuritis is to be treated, according to the symptoms, by local depletion, counter-irritation, the application of ice, and by rest. Local causes, when discoverable, are, if possible, to be removed. The prognosis is either favorable or unfavorable according to the local changes incident to the inflammation, its persistence, and its extension along the nerve, this taking place usually in an ascending or centripetal direction. The cases in which the paralysis is not dependent on any appreciable nerve lesion, nor on inflammation, are the most promising in respect of prognosis, and the treatment in these cases consists chiefly of measures addressed directly to the paralyzed parts. The pathological connections of the paralytical affection, however, are to be considered. Whenever there is ground for a suspicion that the paralysis proceeds from a local cause which involves syphilis, anti-syphilitic treatment should be resorted to. A pathological connection with diphtheria, hysteria, rheumatism, or gout, and also associated morbid conditions, for example, anæmia, claim consideration in the treatment.

Of measures addressed directly to the paralytic affection, the most important, by far, is electricity. The faradic and the galvanic current are each useful, the latter, however, being sometimes effective when the former is without effect. For details respecting the electrical treatment, here as in other connections, the reader is referred to comprehensive works on materia medica and therapeutics (Stillé, Bartholow), or to treatises specially devoted to the medical employment of electricity (Beard and Rockwell, Lincoln, Hamilton). Friction, shampooing, the cold and warm douche in alternation, are subsidiary measures having a certain amount of utility.

PARALYSIS FROM LEAD AND OTHER METALS.

Lead paralysis in its usual form belongs among the local paralytic affections. Whether it be a peripheral paralysis or not, is a pathological question not fully settled, the discussion of which, as of other analogous pathological questions, does not come within the scope of this work. The diagnostic characters of this form of paralysis are so well marked that its recognition is easy. The first manifestation is usually in the extensor digitorum communis. The paralysis, however, is rarely confined to this muscle, but affects the other extensors of the forearm. It is limited to the extensor muscles in the great majority of cases. These may be completely paralyzed, while the flexors retain great strength. The author has given a striking illustration of this fact in another work.[1] The supinators are very rarely paralyzed. With very few exceptions the extensor muscles of both upper extremities become paralyzed either simultaneously, or within a brief period. Atrophy of the paralyzed muscles commences speedily, and progresses rapidly, so that in volume these muscles offer a striking contrast to those to which the paralysis has not extended. The susceptibility to the faradic current of electricity quickly diminishes, and may finally cease, the muscles still responding, and even more than in health, to the galvanic current. Tremor of the paralyzed muscles is an occasional symptom. The cutaneous sensibility is seldom affected.

These characters are sufficiently distinctive for the diagnosis. Corroborative evidence is, however, generally available. In most cases, from the occupation of patients, or other circumstances, the exposure to lead poisoning is known. The paralysis is often preceded by other toxical effects, namely, lead colic, arthralgia, and, perhaps, the cerebral affection known as lead encephalopathy. The blue line on the gums, referred to already in connection with lead colic (page 336), is available as a physical sign in many cases. The presence of lead in the urine may be ascertained by a method of testing which has been described (page 336). These accessory points in evidence are highly important in cases of doubt, and they should not be overlooked, conforming to a practical rule that a diagnosis should always be established as completely as possible.

Cases presenting variations from the usual form of lead paralysis are those in which the paralytic affection is unilateral, and those in which the paralysis is not limited to the extensors, but includes other muscles in different situations. The paralysis may become general, the facial muscles, however, never being included. Probably the limitation of the paralysis in the great majority of cases arises from the fact that, as soon as the extensors are affected, the disease is recognized, and the further introduction of lead into the system is generally prevented. It is not very uncommon for the extensors of the feet and toes to be affected, the appearances being analogous to those which distinguish the "wrist drop." Instances have been reported of paralysis limited to the extensors of the upper and the lower extremity on one side, and thus simulating hemiplegia.

---

[1] *Vide* Principles and Practice of Med., 4th ed., page 677.

Treatment of Paralysis from Lead.

The iodide of potassium is employed in cases of lead paralysis, as in cases of lead colic, and other affections caused by the toxic action of this metal (*vide* page 337). Aside from this remedy, together with the fulfilment of symptomatic indications, and those derived from associated morbid conditions (anæmia, etc.), electrical treatment is mainly to be relied upon. The employment of India-rubber tubing, after Professor Sayre's method in orthopedic surgery, in order to oppose the action of the flexors, preventing the wrist drop, as proposed by Dr. John Van Bibber, is a useful measure.[1]

Improvement is usually slow, recovery rarely taking place under many months. In a considerable proportion of cases the paralysis is permanent. The prognosis, as regards recovery or notable improvement, is unfavorable in proportion to the duration of the affection and the degree of muscular atrophy which has taken place.

The discovery of the source whence lead has been introduced into the system, whenever this is not apparent, is, of course, important in order to prevent its further introduction. All the possible sources are to be considered until this point is settled. Patients engaged in occupations which necessarily involve more or less exposure, and which cannot be relinquished, should adopt certain precautions already referred to (*vide* page 337). Simple precautions, such as the free ventilation of rooms, the atmosphere of which is liable to contain lead, frequent ablutions of the face and hands, the daily use of the warm bath, wearing glasses if the work be of a nature to render this admissible, and putting off garments worn in work hours as soon as these are ended, would probably, in most cases, protect against an accumulation in the system of a sufficient quantity of the metal for its toxical effects. As a prophylactic remedy, the iodide of potassium is to be considered, with our present knowledge, as the most efficient.

PARALYSIS FROM OTHER METALS THAN LEAD.

Copper poisoning, acute and chronic, is generally caused by eating acid or fatty articles of food, either cooked or preserved in copper vessels. The chief symptoms are those denoting gastro-enteritis. Local paralyses occur as a rare consequence of chronic poisoning by this metal. It is stated that the gums sometimes present a purplish line, somewhat analogous to that which is evidence of lead poisoning. The diagnosis is to be based on the gastro-duodenal symptoms, together with knowledge of the fact that the ingesta contained copper. The treatment of the paralytic affection is essentially the same as in cases of lead paralysis.

---

[1] *Vide* Article by Dr. Van Bibber in the New York Med. Journal for May, 1874.

Local paralyses, as well as paraplegia, and sometimes general paralysis, occur as sequels of acute, and, also, as an effect of chronic arsenical poisoning. This pathological connection is readily determinable, certainly in the great majority of cases. Recovery from the paralytic affection, under treatment addressed to the paralyzed muscles, is the rule, but in some cases the paralysis is permanent.

Paralysis from mercury sometimes follows mercurial tremor, and, probably, never without having been preceded by the latter. The evidences of mercurial poisoning, and the characteristic tremor, establish the pathogenesis of the paralysis. The therapeutical indications, as regards the paralytic affection, are the same as in cases of local paralysis from other causes.

X.

SPASMODIC OR CONVULSIVE DISEASES.

TETANUS AND TETANOID SPASMS. EPILEPSY AND EPILEPTOID AFFECTIONS. HYSTERICAL CONVULSIONS AND CATALEPSY. CHOREA. RABIES. LOCAL SPASM.

The individual affections of which spasms or convulsions form the most prominent feature, belong in the class of neuroses, that is, in the present state of knowledge, they are reckoned as functional affections. Spasmodic or convulsive phenomena are symptoms of various diseases which have been already considered, such as cerebral and spinal meningitis, brain-tumors, uræmia, etc. These phenomena may also occur in connection with the essential fevers, and different local affections referable to the several anatomico-physiological systems—the digestive, circulatory, respiratory, and genito-urinary—more especially when the subjects are children. Limiting the affections grouped in this division to those which derive their leading clinical characteristics from spasms or convulsions, it will embrace the following: tetanus and tetanoid spasms; epilepsy and epileptoid affections; hysterical convulsions and catalepsy; chorea and rabies. Added to these are local spasms occurring in different situations.

TETANUS AND TETANOID SPASMS.

The affection called tetanus has clinical characters sufficiently distinctive to attest its individuality. Analogous spasms, that is, tetanoid or tetaniform in character, occur in other pathological connections, and especially as a toxical effect of strychnia. The exclusion of these is the only difficulty in the diagnosis of tetanus.

Tonic spasms, affecting certain portions of the muscular system, constitute the most marked feature of tetanus. Preceded often by symptoms denoting general disturbance or malaise, which are without intrinsic significance as regards premonition, the first manifestations of the affection are a feeling of stiffness referable to the muscles of the jaw, and some difficulty in swallowing. Gradually, in most cases, but sometimes rapidly, the condition known as trismus or lockjaw supervenes. The jaws become tightly closed, so that, in severe cases, it is impossible to separate them. The difficulty in swallowing is increased, and the patient finds it difficult to speak, chiefly in consequence of diminished power of moving the tongue. Following the trismus, the muscles of the neck and trunk are spasmodically contracted. The contractions of the extensor muscles overpower those on the anterior aspect of the body; hence the head and trunk are drawn backward, giving rise to opisthotonos. In severe cases the body is supported solely by the occiput and heels, and may be raised upward without the opisthonotic position giving way. The abdomen is depressed and rigid. The affected muscles are resisting and hard to the touch. They are the seat of severe pain, such as is familiar to those who have experienced cramp of the gastrocnemii or other muscles. The muscles of the extremities are but little, if at all, affected; those of the other extremities are often unaffected. If the spasm affect the extremities, it is usually limited to the extensors. The spasm of the affected muscles is persistent; there is no intermission. Usually, however, the intensity of the spasm is increased at times, constituting marked exacerbations as regards this element. These occur after intervals varying from a few minutes to several hours. The duration of the exacerbations is usually a few seconds or moments only; but they sometimes last for hours. They are often due to some obvious exciting cause which, however, may be slight, such as the voluntary movements of the body or limbs, an effort to swallow, an examination of the muscles by the physician, feeling the pulse, any mental excitement, and even the idea of any proposed voluntary exertion. These facts show a highly exaggerated reflex excitability, and this is evidently an important pathological element of the affection.

The spasm of the muscles of the trunk occasions more or less difficulty in respiration. The respiratory acts are but little increased in frequency, but they are labored. The rigidity of the abdominal muscles interferes with the play of the diaphragm, and the chest movements are impeded. During severe exacerbations the difficulty of respiration is much increased; the patient suffers from a distressing sense of the want of breath, and there may be notable cyanosis. Consciousness is preserved, and the mental faculties, until near the close of life, remain intact. Spasmodic erection of the penis occurs without venereal desires. The suffering prevents sleep; anxiety, distress, and terror are depicted on the face. The pupils are frequently contracted. Strabismus is rare. The face and body are often bathed in perspiration. The facial muscles are sometimes contracted so as to elongate the mouth, and elevate its angles, giving rise to the expression known as risus sardonicus.

The pulse is but little, or not at all, accelerated, and its frequency may be less than in health. It is usually somewhat increased in frequency during the exacerbations of spasm. The thermometrical record in different cases varies within wide limits. In some cases there is little or no elevation of temperature. In the great majority of cases there is more or less elevation, and in some the rise is very great, especially toward the close of life. Frequently, if not generally, the temperature in the evening is somewhat higher than in the morning.[1] A rise of temperature sometimes takes place after death.

The points in the foregoing clinical history which are of special diagnostic import are, the almost invariable occurrence of trismus; the occurrence of opisthotonic spasm subsequently to the trismus; the muscles of the neck and trunk exclusively, or chiefly, affected, that is, the spasm affecting the limbs comparatively but little, if at all; the persistency of spasm without intermissions; consciousness, and the mental faculties unaffected.

With reference to an early diagnosis, certain etiological points are important. Tetanus might be included among the diseases of tropical climates. It is comparatively very rare in temperate latitudes. As a highly interesting fact, may be mentioned its rather frequent occurrence in a portion of Long Island. Within this portion animals are liable to it, so that colts are taken without its limits for the operation of castration. The fact of the frequency of the disease in a limited district in a temperate latitude is of interest as showing an endemic influence. The circumstances peculiar to this district on which depends the endemic influence are yet to be ascertained.[2] In the great majority of cases occurring in tropical as well as other climates, the affection follows a wound of some kind, which may be either severe or slight. Nothing as yet ascertained respecting the circumstances connected with different wounds, furnishes any data for determining beforehand the liability to tetanus. The affection occurs at variable periods from the infliction of wounds, and sometimes after cicatrization has taken place. From these facts it follows that after wounds, especially in tropical climates, the occurrence of general disturbance not explicable by the condition of the wounded part, should lead to a suspicion of tetanus, and the physician should watch for the earliest local symptoms preceding trismus. Not infrequently in tropical, and occasionally in temperate, climates, the affection occurs shortly after birth, generally within nine days (tetanus vel trismus neonatorum). The affection in these cases is considered to be dependent on the sloughing away of the umbilical cord, and therefore as of traumatic origin. The fact of the early symptoms of trismus following a wound of some kind, increases much their significance, but it is to be remembered that tetanus occurs without traumatic causation, and when it cannot be referred to any appreciable cause.

Tetanus is not to be confounded with trismus occurring as a local spasm, that is, the spasmodic affection limited to the masticatory muscles. The absence of spasm of other muscles excludes tetanus, for in the latter affection trismus very rarely, if ever, exists alone; it is followed by tonic contraction of the muscles of the neck and trunk. Moreover, in cases of trismus, occurring as a local affection, there is generally some appreciable disease of the mouth or jaws standing in a causative relation to the spasm.

---

[1] *Vide* Article by Dr. John W. Ogle, in Trans. Clin. Society of London, 1872.

[2] For map showing the district referred to, *vide* Hamilton on Nervous Diseases.

In cerebro-spinal meningitis, basilar meningitis, and meningo-myelitis, trismus is rare; opisthotonos, if it occur, is very rarely as marked as in cases of tetanus, and in these affections there are symptoms which do not belong to the history of tetanus, namely, delirium, coma, paralysis, and clonic convulsions.

Cases of hysteria may present opisthotonos as strongly marked as in tetanus, and also trismus. But these spasmodic contractions are paroxysmal; complete intermissions occur, and the paroxysms are preceded by easily recognized well-known hysterical characteristics. Hysteria simulating tetanus should never occasion doubt in respect of the diagnosis, save for a brief period.

The tetanoid spasms induced by poisonous doses of strychnia, afford the closest analogy to those of tetanus. The analogy is such as to constitute strong ground for the inference that the pathology of tetanus involves the presence in the blood of a toxical agent. But although the sympomatic phenomena are analogous, there are points of distinction which are generally sufficient for the differential diagnosis. In most cases, when the physician is called upon to make the diagnosis of strychnia-poisoning, the cases are those in which this poison is resorted to either for self-destruction, or as a means of destroying the life of others.

The points of distinction from tetanus are as follows: The tetanoid spasms occur in paroxysms, that is, with intermissions. The intermissions usually last for a few moments only, but exceptionally their duration is an hour or even longer. The paroxysms continue for a few moments as a rule. The intermittency is a distinctive point; in tetanus there are remissions and exacerbations, not intermissions and paroxysms. Trismus is often wanting, and when present is less marked than in tetanus. If present, it occurs coincidently with opisthotonos, not preceding it, the latter being a characteristic of tetanus. The spasms extend to the extremities, and are more or less intense, whereas they are implicated slightly, if at all, in tetanus. In strychnia-poisoning, the tetanoid spasms at once or quickly acquire their maximum of intensity, and either death or convalescence is declared within a few hours at farthest, as the rule, and not infrequently life is terminated in a few moments. Tetanus, on the other hand, is developed with comparative slowness; many hours elapse, in most cases, before it reaches its greatest severity, and the termination, whether fatal or in recovery, is usually after several days. The body-heat in strychnia-poisoning is not increased, as in tetanus, and it may be lowered. Vomiting occurs oftener in strychnia-poisoning than in tetanus, and chemical tests will be likely to reveal the presence of the poison in the matters vomited.

Treatment of Tetanus.

The fatality in cases of tetanus is very large. The danger in individual cases is in proportion to the severity of the spasmodic symptoms.

The immediate cause of death, in a certain proportion of cases, is the interference of the spasms with respiration. Exclusive of these cases, the affection destroys life by exhaustion, which, other things being equal, is proportionate to the violence of the spasms. With reference to either of these two modes in which a fatal termination is produced, it is a rational object of treatment to arrest or diminish the muscular contractions. In judging of the efficiency of treatment, however, it is to be borne in mind that, in a small proportion of cases, the affection is mild, having little or no tendency to a fatal result. In newly-born children it is almost invariably fatal. The probability of recovery, after the affection has existed a few days, is much increased with the lapse of each successive day. This fact is to be considered in forming a prognosis, and, also, in judging of the efficacy of treatment.

As might be expected in a disease involving so much suffering and danger, a great number and variety of remedies have been employed in the treatment of tetanus. There is abundant testimony to the efficacy of not a few of these, and yet it cannot be denied that to-day the chances of death in cases of this disease exceed those of recovery. Knowledge of the proportion of cases which would end favorably, if no treatment were pursued, is wanting. Nor is this knowledge to be obtained, except by gathering occasional instances in which it happened that there was no treatment, inasmuch as most physicians would be unwilling to take the responsibility of letting the disease have its course in order to collect data for the study of its natural history. It is probable that in reporting cases successfully treated, allowance has not always been made for those which are mild and intrinsically tend to recovery. But, allowing for every source of error, it is not inconsistent that different remedies may severally prove successful, each effecting the same object, namely, the relief of spasm.

The antiphlogistic measures (blood-letting, etc.) formerly in vogue, are no longer employed, and need not be considered. Tobacco and nicotia have been used with marked success, but they are rarely made use of at the present time, probably because the desired effect may be produced by remedies less distressing in their operation. Tobacco or nicotia, given in doses sufficient to occasion relaxation of the contracted muscles, produces an intensity of nausea and prostration which, if foreseen, a patient would never consent to endure. Alcohol, given to the extent of producing and maintaining inebriation, is among the remedies which have appeared to be successful; but it has yielded place to others more reliable. This may be said also of tartar emetic. Opium has been used very largely in this disease, and, while it is less effective than other remedies in producing relaxation of the contracted muscles, it is invaluable for the relief of pain. It should be given for this end, conjoined with other remedies more potent in effecting the great object of treatment.

The most potent remedies, with our present knowledge, are chloroform, or the chloral hydrate, and the bromides. Chloroform and the chloral hydrate act in a similar manner; the former can be employed with more precision as regards the degree of effect, and is perhaps less dangerous, inasmuch as the latter must be given in large doses to produce the desired result. These agents are undoubtedly to be regarded as the most efficient and reliable in the treatment of tetanus, whether traumatic or idiopathic. Other remedies less efficient and reliable, but, doubtless, useful, are the extract of the calabar bean (physostigma), the cannabis indica, aconite and belladonna. To these should perhaps be added the nitrite of amyl and curara, remedies which deserve further trial in this affection than they have as yet received. The bromides must be given in large doses, to secure their remedial effect.[1]

Cases have been reported in which cold, by means of ice applied to the spine, has apparently proved successful. The cold affusion, after Currie's method, has not given encouraging results, and the violent shock which it occasions renders it inexpedient. The high temperature in some cases furnishes an indication for cold as an antipyretic, and the best method is irrigation as practised with good effect in the essential fevers, it being important to avoid, as far as possible, any excitement or exertion on the part of the patient.

Absolute quietude of mind and body is an essential part of the treatment. Slight circumstances, such as a jar, a current of air, a sudden noise, etc., increase the spasms by reflex excitation. If there be a wound, Bauer enjoins that every examination or dressing should be made only when the patient is under the influence of an anæsthetic. This author also enjoins forewarning the patient when any manipulation is to be employed, as the mind exerts a certain degree of power in preventing the effect of peripheral irritation.

Alimentation is important; and if food cannot be given by the mouth, owing to difficulty of swallowing or trismus, the patient should be nourished by the rectum. This is preferable to the use of the stomach-tube, the introduction of which is likely to increase spasm by reflex excitation.

Treatment in Cases of Poisoning by Strychnia.

The indications for treatment, aside from the expulsion and neutralization of the poison, are essentially the same in cases of poisoning by strychnia as in tetanus. There is this important point of difference, however, between the two: tetanus very rarely kills within a few hours, and usually not until after the lapse of several days; whereas lethal doses of strychnia may destroy in a few minutes, and it is rare for life to be prolonged many hours. It is, therefore, vastly more important, in cases of strychnia-poisoning, to resort promptly to the most efficient and reliable measures of treatment.

Assuming the poison to have been taken into the stomach, if the patient be seen early, the first thing to be done is to evacuate the contents of this organ as thoroughly as possible by either a prompt emetic or the stomach-pump. As moments may be precious, the promptness of the emetic action of mustard is to be remembered, since this is generally obtained without any delay. After the evacuation of the stomach, tannin should be introduced either by swallowing or the stomach-pump, in order to neutralize any portion of the poison which may adhere to the mucous membrane. A strong infusion of tea may be used as a substitute until tannin can be procured. These measures, of course, are not required if the poison have been introduced per enema or by subcutaneous injection. For the prevention and relief of the spasms, chloroform is to be preferred to other remedies on account of its speedy action, if not for its greater efficiency. If chloroform be not quickly available, an infusion of tobacco administered either by the mouth or rectum is, perhaps, next to chloroform, the most prompt and efficient remedy, and this can generally be obtained at once. If a fatal result do not take place within a couple of hours, and tetanoid spasms continue to recur, other remedies may be resorted to; but, in general, recovery may be expected after this period.

---

[1] For a report by Frederick Taylor, M.D., of cases treated with Calabar Bean, Chloral Hydrate, Morphia, Curara, Aconite, Atropine, Cannabis Indica and Nicotine, Succus Conii, Nitrate of Amyl, Bromide of Ammonium and Potassium, and Quinia, *vide* Guy's Hospital Reports, vol. xxiii. 1878. Stillé is of the opinion that "of all the medicines which have cured tetanus, physostigma certainly holds the first place." He states an analysis of cases in 1874, showed a recovery of 33 out of 63 traumatic cases treated by this remedy. *Vide* National Dispensatory, 1879, page 1056.

Epilepsy and Epileptoid Affections.

Epilepsy is a paroxysmal disease, the clinical characteristics being sudden coma with tonic and clonic convulsions, the paroxysms of brief duration and recurring at very variable intervals. This definition is made more complete by adding that the paroxysms are not incident to disease of the kidneys, nor connected with constant, uniform lesions of any organs, the nervous system included; in other words, in the present state of our knowledge, the affection is to be regarded as functional. Paroxysms of coma and convulsions closely resembling those of epilepsy occur in connection with uræmia, alcoholism, and, especially in children, with various disorders. The diagnosis of epilepsy involves the exclusion of these.

A paroxysm of epilepsy occurs, in the majority of cases, without forewarning, either proximately or remotely. Patients subject to the disease are sometimes led to expect that a seizure will soon occur by sensations which, in their experience, have preceded paroxysms. These premonitions are of a varied character, and often prove unreliable. The proximate warnings are sensations felt a few seconds before the loss of consciousness. These are also varied, one of the rarest being the aura epileptica, that is, a feeling of a current of air emanating from some part of the body and ascending to the head. That paroxysms occur generally with no distinct intimation is shown by the fact that, as a rule, patients fall without the least evidence of precaution, receiving not infrequently injuries which, with a little forethought, would have been prevented.

At the instant of the occurrence of coma, the patient utters often a sudden cry which is sometimes piercing and terrific, and falls to the ground. At this instant the face is notably pallid. Immediately the facial muscles, together with those of the eyeballs, neck, and usually also of the trunk and extremities, are affected with tonic spasms. The features are disturbed, the pupils are dilated, the head is drawn backward or to one side, the limbs are extended, the body sometimes having the curve of opisthotonos. The glottis is spasmodically closed, and during this period respiration is suspended. In a few seconds the spasms become clonic. Violent convulsive movements take place, so violent that dislocations and even fracture of the limbs have taken place. Deep congestion with cyanosis of the face follows. Respiration is interrupted. Foamy saliva issues from the mouth, not infrequently colored with blood from wounds inflicted by the teeth on the tongue or inner surface of the cheeks. The convulsive movements are often most marked on one side, and are sometimes entirely unilateral. They continue for a period varying from half a minute to three minutes, very rarely exceeding the latter duration. They gradually lessen and cease, when, in some instances, consciousness at once returns; but oftener the coma continues for a short time, and, in some cases, for several hours. The respirations become tranquil, the dilatation of the pupils disappears and the iris contracts to the stimulus of light, the cyanosis passes off, and the patient either arouses spontaneously or is easily aroused. Somnolence frequently follows the coma.

There are never any essential variations from the typical characters of an epileptic paroxysm. The cry and the tonic spasms are sometimes wanting. In other regards the differences in different cases or in different paroxysms in the same case, relate to the degree or extent of the convulsive movements, and the circumstances therewith associated. Owing to the short duration of the paroxysms, and the inability to predict with anything like certainty the precise time of their occurrence, a patient may be a long time under observation without the physician having an opportunity of witnessing an attack. In most cases the diagnosis must be based on the statements of the friends of the patient or others who may have been present when an attack has occurred. In hospital practice even this source of information is often wanting. Of course, patients are incompetent to describe the paroxysms, and they are sometimes kept in ignorance of the nature of the disease. Moreover, paroxysms sometimes occur only during sleep, and, under these circumstances, may be witnessed by no one. In view of these facts, it is important to bear in mind the diagnostic characters which can be learned from others, and some of them from the patient. A case presenting itself in which "fits" have occurred, the problem being to determine whether they were epileptic, the points of inquiry for positive evidence are as follows: Their sudden occurrence without any warning apparent to others, and often without any obvious exciting cause, the patient being in usual health; the utterance of a cry at the time of the attack; the complete loss of consciousness; the clonic, preceded by the tonic, convulsions; the distortions of the face and frothing at the mouth; the bloody saliva, soreness of the tongue or cheeks after the paroxysm, and sometimes a greater or less number of cicatrices showing a series of wounds of the tongue; the short duration of the paroxysms, taking care that this is not guessed at, but ascertained by the watch, and the recurrence, in greater or less number, of paroxysms presenting all, or the greater part of, these diagnostic characters. Of an epileptic paroxysm occurring in sleep, and observed by no one, the evidences are, blood on the lips or pillow, a wounded tongue or cheek, and a sense of fatigue on awakening not otherwise explicable. These evidences are sufficient if it be known that the patient is subject to epilepsy. If this be not known, as is sometimes the case, the paroxysms occurring only at night, measures should be taken to have the patient under observation during the hours of sleep.

Epileptiform convulsions are a manifestation of uræmia; they occur in the puerperal state, being generally under these circumstances uræmic; they are among the effects of drunkenness; they are frequent in children, in connection with dentition, disorders of digestion, and at the commencement of febrile and inflammatory diseases; they are incident to tumors and other cerebral affections either in children or adults, and in rare instances they are attributable to lead poisoning. The term eclampsia is often applied to the convulsions occurring in several of these pathological connections, more especially in the puerperal state, and in children. There is no occasion for the use of this term as the name of an individual affection, but, if retained, it should be considered as denoting convulsions epileptiform, not epileptic, dependent on functional morbid conditions. There is seldom difficulty in determining that epileptiform convulsions do not denote epilepsy, from the absence of certain of the diagnostic characters of epileptic paroxysms, and the existence of circumstances which point clearly to other causative relations. Uræmic convulsions have been mistaken for those of epilepsy, but it is extremely rare for the duration of the former to be as brief as that of the paroxysms of the latter, and the symptoms preceding and associated with uræmic convulsions cannot fail to indicate their character, with due knowledge and attention on the part of the practitioner. Doubt as to the diagnosis of epilepsy can only obtain with reference to the primary paroxysms; in general, the recurrence of characteristic paroxysms renders the recognition of the disease not difficult, and, in most instances, the physician is aware at the outset that he has to deal with this affection.

Malingerers sometimes undertake the simulation of epilepsy. The deception cannot fail to be detected when the simulated "fits" are tested by the diagnostic characters of those which are truly epileptic. Frothing at the mouth may be imitated by soap or some other substance; but the succession of tonic and clonic spasms, the closure of the glottis, the pallor of the face succeeded by cyanosis, the dilatation of the pupils, and the short duration of the convulsive movements—all essential to a well pronounced paroxysm of epilepsy—will certainly not, collectively, be accurately represented. To avoid being deceived, it is only necessary to bear in mind these diagnostic characters. The mode of falling will probably suffice to show at once the imposition; the malingerer takes the precaution to fall in a manner not to receive any injury.

There are no ascertained laws governing the recurrence of epileptic paroxysms. They recur in different cases, apparently, with the utmost irregularity. In some cases several hundred attacks occur within twenty-four hours. Delasiauve, as quoted by Nothnagel, noted 2500 within a month. In a case observed by the author at least one-half of this number occurred within fourteen days. They occur in different cases after intervals of days, weeks, months, and years. The nearest approach to periodicity is afforded by some cases in which the attacks occur pretty regularly at the time of the menstrual period. In some individual cases, about the same number of attacks occur in a given period, *e. g.*, a year. It not uncommon for attacks to occur more or less frequently for a certain period, and be followed by an intermission of several months. Sometimes there is an intermission of several years, irrespective of any therapeutic agency. These irregularities are of course to be considered in judging of the efficacy of treatment. It may be added that while in some instances paroxysms appear to be attributable to an exciting cause, in many, and perhaps the great majority, they are without any appreciable causation. There are no circumstances connected with the paroxysms on which can be predicated any opinion in respect of the frequency or infrequency of their recurrence.

The effects of epilepsy on the mind are of clinical importance. An occasional immediate effect of a paroxysm is mania. This is generally harmless, but the patient is sometimes dangerous. Reynolds's estimate that the proportion of cases in which mania occurs is about one-tenth, is not too high. The mania is usually of brief duration. It is peculiar to certain cases, that is, some patients are liable, after each paroxysm, to this immediate effect. After a series of paroxysms occurring in rapid succession, the mental faculties are temporarily much weakened; for a time the patient may be idiotic. In most cases, soon after a single paroxysm, there is no notable impairment, and the mind is sometimes clearer after than before its occurrence. It is not uncommon for patients to be mentally depressed after a paroxysm; but this is easily accounted for by the sad reflections which are naturally at that time more vivid.

As regards remote effects on the mind, it is well known that some of the men most distinguished for intellectual endowments have been subject to epilepsy, *e. g.*, Julius Cæsar and Napoleon Bonaparte. In less conspicuous instances the disease has not interfered with the development and preservation of the mental powers. It would probably be found in these instances that the disease was not allowed to stand in the way of education or the exercise of the faculties of the mind. On the other hand, it is a matter of observation that confirmed epileptics are apt to show either a lack of mental development or mental deterioration in a greater or less degree. The author has been led to think that this is chiefly because in young subjects mental application is apt to be restrained, and in mature years habits of mental activity are often relinquished in consequence of the existence of the disease. In other words, the mental faculties are imperfectly developed or deteriorate, not from the disease *per se*, but from the fact that they are inadequately exercised for their improvement and preservation. The practical bearing of this view is obvious. Epilepsy should interfere as little as possible with education and mental activity. It is important to add that there is no ground for the apprehension that exercise of the faculties of the mind, within proper limits, has any unfavorable influence upon the disease.

EPILEPTOID PAROXYSMS.

It is convenient to make an arbitrary distinction in applying the terms epileptiform and epileptoid. The former of these terms, as has been seen, is applied to convulsions resembling those of epilepsy, but with certain points of difference, and having various pathological relations. Epileptiform convulsions are often as severe as those of epilepsy, and are symptomatic of morbid conditions vastly more dangerous to life. Epileptoid paroxysms, on the other hand, are supposed to have essentially the same character as those of epilepsy, and to proceed from the same determining internal agency, the difference being, not in kind, but in degree. They are imperfect or mild epileptic manifestations. Fully developed, and more or less intense, paroxysms are evidence of epilepsia gravior; those which are epileptoid denote epilepsia mitior. The French terms *le grand* or *le haut mal*, and *le petit mal*, are quoted by all writers as expressive of the distinction between the epileptic and the epileptoid variety of the disease.

There are various kinds of epileptoid manifestations. Loss of consciousness for a few seconds, with a change in the expression of the face, and fixedness of position, recovery of consciousness taking place, and the occupation, or, it may be, the conversation, continued as if nothing had happened, is one form. With the loss of consciousness other manifestations may be connected, such as a grimace, a lateral movement of the head, masticatory movements. Running a short distance, rotatory movements of the body, jumping violently, etc., characterize the paroxysms in some cases. Tonic or clonic spasms of one or more of the extremities sometimes take place. Another variety is momentary delirium, as shown by sudden laughter, incoherent or incongruous language, and, in some rare instances, violent mania. Examples of most of these different kinds of epileptoid paroxysms have fallen under the author's observation. They occur during the interparoxysmal period in cases of epilepsy, and, also, before pronounced epileptic paroxysms have occurred. Under the latter circumstances they undoubtedly should be considered as forerunners of epilepsy; yet the author has met with instances in which they had occurred for several years, and epileptic paroxysms had not taken place.

Regarding them as representing essentially a mild form of epilepsy, and as denoting a liability, to say the least, to the grave form, the recognition of epileptoid paroxysms is highly important. Notwithstanding the differences in kind, the diagnosis is generally easy. The character of the paroxysms, although varied in different cases, the brief duration, and the recurrences are distinctive. Of course, when they occur in patients who are known to be epileptics, or when well-marked epilepsy supervenes, the diagnosis does not admit of doubt.

It may be remarked that, exclusive of epileptoid paroxysms, there are no symptoms which warrant in any case the statement to a patient that there is danger of epilepsy. The author has known this statement, made incautiously and unwarrantably, prove the occasion of many years of needless anxiety. Epilepsy is justly regarded as one of the most terrible of the diseases which flesh is heir to, and it is a cruel act to intimate, on insufficient evidence, danger of its occurrence. Indeed, it may be the duty of the physician, on the score of humanity, to conceal from the patient apprehensions which are well grounded.

Treatment of Epilepsy.

The essential pathological condition, whatever it be, which underlies the manifestations of this disease, does not endanger life, nor are the paroxysms, however frequent and severe, incompatible with good health in other respects, and long life. These facts bring but little consolation to the unhappy epileptic. The terrible nature of the disease furnishes motive enough for strenuous efforts to effect a cure. The prospect of this result in any case, it must be confessed, is small; but a cure is sometimes effected, and more or less improvement may always be hoped for with much confidence. The latter result is a sufficient inducement for efforts on the part of physician and patient, and the infrequency of a cure should not restrain perseverance until after the trial of all measures which give any promise of success.

The casual indications for treatment are mostly those which are common to all chronic affections. Abuses of the sexual function have been supposed to enter into the etiology, and if these be found to exist, they are to be reformed. Hygienic errors relating to diet, the use of alcoholics or tobacco, over-exertion of mind or body, etc., are to be inquired into and corrected. Important as may be this part of the treatment, the reliance for a cure must be chiefly on anti-epileptic remedies.

Of the great number of remedies which have been employed in the treatment of this disease, it cannot be doubted that not a few have sometimes proved successful, and have been more or less useful when a cure has not been effected. It is true that, as a criterion for judging of the effects of medicinal treatment, we have not the results of the analysis of a collection of cases in which no remedies were employed. It cannot be expected that there will ever be such a collection; for it would involve the necessity of an agreement among a number of practitioners to withhold treatment from cases falling under observation, with the object of obtaining data for the natural history of the disease. Desirable as might be the results, such an agreement with reference to a disease like this, it is safe to say, would be an impossibility. It is not uncommon for cases which have received a variety of treatment, to be allowed to go on without further remedies, owing to the discouragement of patients and physicians. As judged by these cases, it is probably correct to state that, as a rule, the disease tends to continue, and with an increase rather than a decrease in the frequency of paroxysms. Yet there are exceptions to this rule. The author has met with an instance in which, a number of remedies having been tried with no benefit, all treatment was abandoned, and the paroxysms subsequently ceased for ten or twelve years, recurring after this lapse of time. Assuming as correct the rule just stated, the testimony of recoveries and improvement during the employment of a number of different remedies, is conclusive as to their being in certain cases either efficacious or useful. Unfortunately, in the present state of our knowledge, it is impossible to indicate the circumstances in individual cases which will enable the practitioner to decide beforehand as to the particular remedy most likely to be successful in each case. The course to be pursued, therefore, is to make trial first of the remedies which experience has shown to be useful in the larger number of cases, and, if these fail, the treatment is not to be abandoned without trying the remedies on which, relatively, less reliance is to be placed.

Of the known anti-epileptic remedies, the bromides are entitled to the first place. The bromide of potassium has been most used. The other bromine salts are considered to be less valuable in this disease; but data for a positive statement with reference to this point are wanting. The point is of practical importance, for, if all are alike valuable, or measurably so, another may be substituted for one which is not well tolerated, and, by alternations, evils are avoided which may be caused by the long continued use of the same base. The author has been in the habit of prescribing successively the different bromides in the same case, but without noting observations sufficient for practical deductions. The bromides should be given in doses as large as are well tolerated; of the bromide of potassium, from 20 to 40 grains are generally well borne three times daily. When symptoms denoting bromism occur, the remedy should be suspended for a short time, and resumed, the doses being afterward perhaps diminished. If no effect upon the disease be observed after two or three months, the remedy may be discontinued, on the ground that it will not prove of service. If, on the other hand, the paroxysms cease to recur, or recur less frequently, the remedy should be continued for a long period—one or two years or longer. It should be gradually, not suddenly, discontinued. As it is desirable to know in each case how much effect upon the disease is produced by the remedy, it should for some time be given alone, that is, not combined with any other anti-epileptic remedy. After its effect has been ascertained, if there be more or less improvement, but not an arrest of the paroxysms, another remedy may be given in conjunction. Experience justifies the physician in holding out hopes of a cure from this remedy; but it is only in a small proportion of cases that this complete success is obtained. Notable improvement, as shown by the comparative infrequency of the paroxysms, is produced in a considerable proportion of cases. In a small proportion there is no remedial effect. It is stated that the disease is less amenable to this remedy when the paroxysms occur only in the night. The tolerance of the bromides varies much in different cases. This is to be ascertained, of course, by trial in each case, and the doses graduated accordingly. Unless the paroxysms cease under doses which do not produce bromism, they should be increased until evidence of the latter is afforded by somnolence, some confusion of ideas, uncertainty of gait, etc. When these symptoms are manifested, either the remedy should be temporarily discontinued, or the doses lessened. The danger of toxic doses should be borne in mind.

In view of the testimony of competent and conscientious observers, it must be admitted that the oxide of zinc is, in some cases, an efficacious anti-epileptic remedy, although its efficacy was undoubtedly much overrated by Herpen. It should be tried when the bromides fail, and it may be given in conjunction with these if they are but partially successful. This, like other remedies, is more likely to prove useful the earlier it is employed. It is, therefore, unfair to judge of the value of any remedy exclusively from its employment in cases of long standing. This is an important consideration as applied to all anti-epileptic remedies. Herpen's method was to commence with from 2 to 3 grains three times daily, an hour after meals, and gradually increase the doses to 15 grains. If the remedy be tolerated, a fair test requires its continuance for three months. It is to be continued longer, in doses which are tolerated, if the paroxysms cease. If these be rendered less frequent, but not prevented, it should be associated with other remedies. Other preparations of zinc, namely, the lactate, phosphate, sulphate, and valerianate, have been given with success.

The nitrate of silver, formerly much used in this disease, has fallen into disrepute. Yet it belongs among the remedies which are sometimes successful. The danger of causing a permanent discoloration of the skin is to be avoided by following the rule inculcated by Bartholow, namely, not to continue its use uninterruptedly for a longer period than six weeks.

The ammoniated copper has effected cures, and improvement when it has failed to cure. This may be said of belladonna or atropia, beginning with small doses, increasing gradually to the limit of comfortable tolerance, continued for several months before deciding that it fails, and persisting in its use for one or two years if it prove completely or partially successful.

Other anti-epileptic remedies are digitalis, valerian, wormwood, stramonium, ergot or ergotine, opium, and strychnia. With regard to these remedies, severally, the practical rule should be to employ each, at first, singly, not in combination with any of the others, in order to test its efficacy, rejecting it after a fair trial if it prove of no benefit, continuing it if it prevent the paroxysms, and combining with it successively other remedies if it be but partially successful.

A case should not be abandoned therapeutically without the trial, in addition, of saline or other purgatives, galvanism, and a systematic hydropathic treatment. Nothnagel states that from the latter, methodically carried out, in a well-conducted cold water cure institute, he has seen very essential improvement, although in no instance complete recovery.[1]

It is by no means improbable that a remedy or remedies may be hereafter discovered to be as much more efficacious than the bromides, as these are superior to the remedies heretofore in vogue in the treatment of this disease. This seems the less improbable if we accept the theory that the epileptic paroxysms are caused by the presence in the blood of a toxic agent, analogous in its effects to that which exists in uræmia.

Treatment of Epileptic Paroxysms.

Certain precautions, to prevent self-injury during the paroxysms, are important. The sides of the bed on which the patient sleeps should be raised, in order to avoid the danger of being thrown upon the floor by the violence of the convulsions. It is desirable that a friend or an attendant should be at hand if a paroxysm occur in the night, to prevent suffocation from the face being forcibly pressed upon the pillow. It should be enjoined upon patients subject to epileptic paroxysms, to avoid situations in which they are liable to fall into the fire, or from a height. In a coroner's case which came under the author's observation, death had taken place during a paroxysm occurring in a stable, the patient being an ostler. The autopsy showed in the air-passages stubble and manure, which had been inhaled and caused suffocation. Epileptics should never bathe unattended.

---

[1] Ziemssen's Cylopædia, Am. ed., vol. xiv. p. 284.

It is rare for the warning of a paroxysm to be recognized, leaving time enough to resort to a preventive remedy; and when a paroxysm has begun, it is useless to attempt to cut it short. There would be small advantage were an attempt successful, inasmuch as the duration of the paroxysm seldom exceeds three minutes. When, however, a series of paroxysms takes place, a few moments only intervening, the *état epileptique*, as termed by French writers, existing, preventive treatment is important. The inhalation of chloroform may be tried. Pressure upon the carotids, which has been recommended, seems not to have proved effectual, and this measure conflicts theoretically with the supposed pathological condition of the brain (ischæmia) at the time when the paroxysm occurs. The nitrite of amyl has been found to be successful, and is the most reliable of any known remedy for this object. Five minims may be taken by inhalation at the instant of pallor or any evidence of an impending paroxysm. This remedy is not appropriate after the paroxysm has commenced. Epileptic patients who have premonitions of the attack, may be provided with this remedy, and carry it about with them, so that it may be resorted to without any delay. A convenient arrangement for this purpose has been derived by Dr. McBride, namely, the doses are contained in separate glass capsules, which are broken and their contents liberated in an instant.

Treatment in Cases of Epileptoid Paroxysms.

Cases in which the paroxysms are epileptoid are to be treated as if epilepsy existed, which essentially is the fact. Observations agree in showing that the bromides are less likely to prove successful in epileptoid than in the truly epileptic paroxysms. The statement, however, that they are never useful in the former is an error, and, still more, that they are apt to aggravate the affection. If epileptic succeed to epileptoid paroxysms under the treatment of the bromides, or any other remedies, it is owing to the further development of the disease from an intrinsic tendency, and is simply proof that the treatment has been without avail. In cases of epileptoid paroxysms, the bromides should be fairly tried, and they will sometimes be efficacious. As regards other remedies and measures of treatment, the general principles are the same as in cases of fully developed epilepsy.

HYSTERICAL CONVULSIONS.

In most cases, hysterical convulsions are distinguished without difficulty. The distinctive points relate to the convulsive movements which are to be considered in connection with antecedent and concomitant symptoms. The convulsions are preceded by more or less of the numerous and varied phenomena grouped under the name hysteria, such as laughing or crying without motive, alternately and incongruously; globus hystericus, contraction of the flexor muscles, nictitation, various hyperæsthesias or anæsthesias, etc. The occurrence of these antecedent phenomena can be ascertained if they have not been observed by the physician. A concomitant symptom is hysterical coma, the characters of which have been considered (*vide* page 513). These circumstances are not sufficient for determining the character of the convulsions, for they may be associated with convulsions which are tetanic or tetanoid and epileptic or epileptiform. The distinctive points which relate to the convulsive movements are therefore essential for the diagnosis.

Hysterical convulsions are not purely automatic or involuntary. This is the characteristic feature. They involve the will, and, to a certain extent, the consciousness. The volitional character is apparent in the movements. The patient strikes at surrounding objects, beats the breast, pulls the hair, throws the body into various postures or contortions—these movements evidently showing the exercise of the will; whereas convulsive movements which are not hysterical, nor simulated, are obviously devoid of volitional agency, that is, they are automatic.

There is no difficulty in the practical appreciation of the characteristic feature just stated. But, in some cases, hysterical convulsions either precede or follow those having the characters of tetanus and epilepsy. Trismus and opisthotonos sometimes occur in connection with hysteria. Their association with convulsions which are manifestly hysterical, the occurrence of trismus without opisthotonos and *vice versa*, the absence of traumatic causes, taken in connection with the existence of other hysterical phenomena, are the points to be considered in deciding that the disease is not tetanus, but hysteria with tetanoid manifestations, or, in other words, hysteria simulating tetanus.

The association of hysterical convulsions with those which are either epileptic or epileptiform, is to be explained, in some cases, by the fact that the patient is subject both to hysteria and epilepsy, the convulsive phenomena of both happening to be coincident. The hysteria, in these cases, may determine the occurrence of an epileptic paroxysm, or the latter may prove the exciting cause of an attack of hysterical convulsions when these immediately follow the attack of epilepsy. It may happen that a first attack of epilepsy occurs in connection with hysterical convulsions. The recurrence of epileptic paroxysms will then show that the patient is affected with epilepsy. But, aside from these cases, in an hysterical attack, convulsions may occur which are epileptiform in character, the patient not having epilepsy either before or afterward. The author has observed an instance of this kind. In neither of these cases are hysteria and epilepsy pathologically combined. It is simply a concurrence when a truly epileptic paroxysm occurs in connection with convulsions which are hysterical; and, in the cases last referred to, a truly epileptic paroxysm does not occur, but convulsions resembling those of epilepsy, that is, epileptiform. The name hystero-epilepsy, which implies a pathological combination of the two affections, is not, therefore, with strict propriety, applied to any of these cases.

Treatment of Hysterical Convulsions.

The treatment of hysterical convulsions is essentially the same as that of the coexisting hysterical coma (*vide* page 514). The cold douche applied to the head is the most efficient measure. The convulsive movements should not be forcibly restrained. Protecting the patient against self-injury, the convulsions may safely, and sometimes judiciously, be permitted to continue and wear themselves out. An opiate may be given in some cases, or antispasmodics, *e. g.*, valerian and assafœtida. The judgment and tact of the physician are to be exercised in either giving or withholding the proper name of the malady to the friends and to the patient; as, also, in other measures to be pursued. The word *hysterics* is usually not agreeable to a patient, and it may lead to injustice on the part of friends, a common belief being that it denotes phenomena which are purely imaginary and voluntary. The convulsions are not simulated, the patient is not a malingerer; but the physician may often bring to bear a moral influence which will restore self-control, the loss of which is an essential element. Sometimes using the term *hysterics* is efficient for this end. Apprehension and sympathy on the part of friends undoubtedly sometimes tend to keep up the hysterical manifestations. On the other hand, it is unjust to the patient to treat the latter too lightly. The moral management is the most important part of the treatment, and is to be governed by the circumstances pertaining to individual cases. The treatment of hysteria, exclusive of the convulsions, will enter into the consideration of this affection in the latter part of this section.

CATALEPSY.

Catalepsy is a paroxysmal affection in which the voluntary muscular system is so modified that the trunk and its members remain motionless, and retain, for a time, the various positions in which they may be placed. The muscles are in a state of tonic rigidity which is entirely independent of any volitional agency; but passive movements can be made with the exercise of moderate force, and the rigid contraction of the muscles holds the body or limbs in different positions without any effort of the will. A remarkable feature is, that positions difficult to assume voluntarily are maintained by a species of tonic spasm much longer than would be possible by the power of the will. The extremities may be held in opposition to the force of gravity, when, were the effort voluntary, the muscles would have given way from fatigue. A striking illustration is to raise the arms and the trunk so as to form with the lower extremities an acute angle. The cataleptic patient remains in this constrained posture for a period longer than would be possible in health. The patient resembles the lay figure of the artist. The duration of the fixedness of position, however, has its limits. After some minutes the muscles yield, and the muscular contraction is gradually overcome by the force of gravity. This feature of catalepsy is pathognomonic; it occurs in no other affection, and the diagnosis, therefore, is easy. It is only necessary to exclude malingering. It is stated that catalepsy is sometimes feigned. The attempt at deception would imply an accurate knowledge by the malingerer of the characteristic feature of the affection. The author has never met with an instance. A cataleptic condition is induced in some susceptible persons by the manipulations belonging to the practice of what has been called animal magnetism.

The affection is to be regarded as one of the numerous phases of hysteria. In connection with the pathognomonic condition of the muscular system, there is loss of consciousness more or less complete, in er words, hysterical coma. Hysterical convulsions may precede or follow the cataleptic phenomena. As in hysterical coma without catalepsy, the respirations and the circulation are not notably disturbed. The digestive processes are not suspended. The temperature of the body is not raised, but sometimes falls below the minimum of health. Coldness of the surface is marked in some cases. It is a traditional belief that cataleptic patients have been buried alive. If this have ever happened, one can hardly conceive of the possibility of its occurrence at he present day.

Catalepsy may occur suddenly without forewarning, but it is usually preceded by hysterical manifestations of some sort. The duration of the roxysms varies from a few minutes to many hours, and even days. e paroxysms may be repeated an indefinite number of times in rapid succession, or, if they recur at all, it may be after days, months, or years. There is no uniformity in these regards in different cases. Hysterical manifestations, varying in character in different cases, usually follow the paroxysms.

The affection is so rare that probably the majority of physicians of considerable experience have never met with an example. It occurs in men, but much oftener in women. In most cases the patients are young. It is rare after middle age. It has been observed as early as the fifth year.

Treatment of Catalepsy.

The cataleptic condition is of no more gravity than the hysterical coma with which it is associated. The treatment during the paroxysms is the same as when the latter exists without catalepsy (*vide* page 514). As regards the preventive treatment and the indications in the intervals, cases do not differ from those of hysteria with a tendency to coma and convulsions.

CHOREA.

Chorea, like catalepsy, is an affection easily recognized. The diagnostic feature is the occurrence of irregular jerking movements of the limbs, the muscles of the face, the head, shoulders, and, in some cases, the trunk. The movements take place without any rhythmical order. They are excited by acts of volition, but they also occur without any voluntary agency. Choreic differ from ataxic movements in this: they are either wholly involuntary or merely excited by the will; whereas, in ataxia, they are altogether voluntary but inco-ordinate. The movements in chorea are spasmodic, but spasm is not an element in ataxia. The chronic movements differ from the tremor of paralysis agitans and of multiple sclerosis, in the absence of regularity or rhythm. This is sufficient for the exclusion of these affections.

Cases of chorea differ much in the force of the muscular contractions, and the extent of the muscular system affected. The affection is severe in proportion as the movements are forcible and general. In mild cases the spasms occur only when there is an exercise of volition, and they are limited to the face and extremities. In a severe form, spasmodic movements occur irrespective of volition, the limits and body being jerked with violence in various directions. In cases of the latter form there is utter helplessness; the patient cannot perform any voluntary act with the hands, there is inability to walk or stand, and sometimes to prevent being thrown from the chair or bed. The jaws may be opened and closed with force. The tongue may be quickly protruded and retracted. Articulation is in some cases difficult or impossible. The contractions of the facial muscles occasion extraordinary grimaces, and, as it is not easy to appreciate that these are automatic, the patient seems to be intentionally "making faces." As a rule, the choreic spasms are suspended during sleep, but there are exceptions to this rule. The movements are temporarily arrested by the inhalation of chloroform or the administration of chloral hydrate. In a certain proportion of cases the spasms are limited to one side (hemi-chorea).

A sudden attack of chorea is rare. Generally the development of the affection is gradual. It is usually preceded by mental irritabilty and impaired general health. The first manifestations are restlessness and lack of power to perform voluntary acts with precision. In children these early symptoms are apt to be attributed to want of attention or carelessness.

The affection is rare under six years of age. It is most apt to occur between the ages of eleven and fifteen years. Next in liability are the ages between fifteen and twenty-one years. In middle and advanced age it is extremely rare. Females are affected much oftener than males.

The affection is compatible with a normal condition of the vital functions—appetite, digestion, nutrition, respiration, circulation, and temperature. It is, however, often associated with anæmia. Mental irritability is constant, and generally marked. This is in a great measure due to the annoyance and mortification which the affection occasions. More or less muscular weakness is a result of the action of the muscles. Systolic murmur at the base of the heart is common, and is accounted for by the anæmia. A systolic murmur may also be found at the apex, and this murmur may disappear after recovery.

Treatment of Chorea.

In the great majority of cases this affection ends in recovery after a duration of from two to three months. The instances are few of its ending sooner than two months, whatever treatment may be pursued. It continues in some instances for many months, ending at last in recovery. In very rare instances it persists as a permanent affection, and is associated with mental imbecility. Of the very small number of cases in which it ends fatally, in all, probably, this termination involves antecedent or complicating affections. An intrinsic tendency to recovery and self-limitation are to be regarded in the light of important, and perhaps the most important, factors in the successful management of cases. There is no method of abortive treatment which can be relied upon. It is, however, probable that the duration may be shortened by therapeutical measures, and that notable relief may be derived therefrom cannot be doubted.

Causal indications are to be sought after. The affection has been known to end directly after the expulsion of a tape-worm. In children especially it should be ascertained whether other intestinal worms (ascaris lumbricoides et vermicularis) be not present. Habits of self-abuse are to be inquired into. Attention should be directed to overtasking of the mind by study, or over-excitation of the sentiments. These points have reference to causes which are perhaps auxiliary, if not sufficient in themselves to give rise to the affection. The hygienic treatment is of primary importance. The patient should be well nourished. As much out-of-door life as is practicable is desirable. Exposure to the observation of others is to be avoided, as this is a source of mortification, and tends to increase the choreic manifestations. Other affections which may coexist are likely to have a causal influence. This is especially true of anæmia, which exists in a large proportion of cases. The removal of this condition by chalybeates conjoined with a nutritious diet, etc., is an important part of the treatment.

Of the numerous remedies which have been supposed to be curative, arsenic has the strongest testimony in its favor. There is a very general agreement among authors as to the value of this remedy in shortening the duration of the affection, and diminishing its severity. The propriety of giving Fowler's solution in doses of from five to eight drops for children, and from eight to twelve drops for adults, as recommended by Ziemssen, is questionable. These doses are doubtless tolerated at the outset by some patients, but they are liable to occasion irritation of the stomach, and the necessary discontinuance of the remedy before it has exerted its curative effect. A better plan is to give smaller doses, and to increase them very gradually, if at all.

Other remedies which have been recommended, but the curative efficacy of which, making allowance for the intrinsic tendencies of the affection, must be considered as doubtful, are the ammoniated copper, the oxide and sulphate of zinc, the cimicifuga root, the bromine salts, strychnia, and nux vomica, the extract of Calabar bean, and the Indian hemp.

Palliative measures are indicated if the choreic movements are constant or violent, and especially if they continue during sleep. Much may be accomplished in the way of palliation by the administration of the hydrate of chloral, opium in some form, ice bags, and the ether spray applied to the spine. The latter may be applied three times daily, each application lasting from four to eight minutes. Cod-liver oil and the hypophosphites appear to be useful, although in no sense curative. The warm or tepid bath is of benefit. The author has known the cold-shower bath to prove apparently serviceable, but the measure is too severe for most cases, especially in young children. Drs. Beard and Rockwell report cases of apparent striking benefit from electricity, the affection, in the reported cases, having been of considerable duration when this remedy was resorted to. The methods which in their hands have been successful are general faradization and central galvanization. The latter should be employed with caution, short sittings and a mild current being advisable. General faradization is the preferable method.

Relapses of chorea are frequent. Of this patients and friends should be forewarned. The preventive treatment consists of the continued use of chalybeates, if anæmia persist, the avoidance of everything which will excite unduly the mind, or overtask its powers, and measures to strengthen the mental and physical constitution.

Rabies.

Rabies may be defined a toxical affection characterized by paroxysmal spasms, affecting especially deglutition and respiration, together with frequently clonic convulsions and delirium, the affection ending fatally within a period of five days. The diagnostic characters are so distinctive, and they are generally so well marked, that the recognition of the affection is easy. Exceptionally, when some of them are wanting, there is room for doubt as to the diagnosis.

The toxical agent is a virus contained in the saliva of the dog (Rabies canina), the cat, the fox, or the wolf. It is received by inoculation by means of the teeth of the animal from which it is derived. But the saliva containing the virus may communicate the disease, if it come into contact with the skin in places where there are sores or excoriations, so that a bite is not essential. Probably in this way the disease might be received from herbivorous animals which rarely bite, and, perhaps, even from the human subject. The animal furnishing the virus is probably in all instances affected with the disease, that is, rabid. This has been denied, but, as the virus is a morbid product, it is evidence of the disease which, in some instances among animals, may not present the usual manifestations. In other words, animals may be rabid without appearing to be so. It is certain that the disease may not manifest itself for some time after it exists, and, therefore, an animal may communicate it when apparently perfectly well. In most cases of rabies in man, it is known that the patient has been bitten by one of the animals named, and also that the animal was presumably, if not certainly, rabid. These facts are, of course, to be taken into account in the early recognition of the affection, and in the diagnosis of doubtful cases.

The period of incubation is to be considered in the diagnosis, but much more in giving an assurance of safety after exposure to the virus. The variability of this period is remarkable. The disease is very rarely developed within a week. In a large majority of cases it is developed within two months. After this lapse of time, the probability of safety is very great. After six months the chances that the disease will occur are extremely few. There is not absolute security after a year; but the instances in which the period of incubation has extended over this period, or over several years, if authentic, are so anomalous that practically they may be disregarded.

The grounds for hoping that the inoculation has not been effective after a bite by an animal known to be rabid, may be referred to in this connection. From official reports made to the Committee of Public Hygiene from forty-nine departments in France, 320 persons were bitten by rabid animals from 1863 to 1868. Of these 320 persons, 129 died from rabies, and in 123 the wounds were not followed by the disease. According to these statistics the probabilities of an ineffective inoculation are about 38 in 100.[1] It is thus seen that after a wound has been inflicted by an animal known to be rabid, much encouragement may be given in the hope for escape.

Preceding the symptoms characteristic of rabies is a condition of malaise with notable mental depression. The latter is probably due, in a great measure, to apprehension of the disease. The *stadium melancholicum* is sometimes wanting. In a case related to the author in which a person was bitten by a dog, not known at the time or afterward to have been diseased, no apprehension having been felt as to any result, the first intimation of rabies was a shuddering sensation in drinking water. The patient had supposed himself to be perfectly well up to that moment. The prodromic periods, when present, last only a day or two. The most characteristic symptoms are manifested in connection with the act of drinking water. The act is difficult or impossible from a sense of suffocation. The difficulty seems to arise from pharyngeal and laryngeal spasm. When this diagnostic feature has become well marked, the patient makes the attempt to swallow a liquid with an appearance of determined resolution; directly the liquid enters the mouth, spasm is excited; the face is congested, or, perhaps, livid, with an expression of intense distress and terror; the whole body is thrown into agitation; more or less of the liquid may be ejected from the mouth with force, or deglutition is accomplished, and the patient lies down panting and exhausted. A renewal of the attempt is naturally dreaded, so that the patient prefers to suffer from thirst; hence, the significance of the term hydrophobia, which is commonly used as the name of the disease. After repetitions of these paroxysms, they are often, not always, excited by the sight of liquids, or even by the thought of an attempt to swallow them. It is a singular fact that other liquids than water are, in some cases, taken with comparative ease. The latter is sometimes swallowed without great difficulty if given in a very small quantity at a time, and thirst may be alleviated by sucking pieces of ice.

At first, between the paroxysms occasioned by attempts to drink, or the hydrophobia, the patient may be comparatively comfortable. Soon, however, other symptoms are added. Delirium occurs in some cases. This may have the characters of acute mania, requiring restraint; or it may consist of hallucinations and delusions. Patients very rarely, if ever, offer violence to those around them, and never attempt to bite. It is a popular error that they imitate the barking of a dog, or that their ravings relate in any way to the animal from which the virus was received. The delirium may be tranquil. Feelings of great tenderness to relatives and friends are sometimes manifested. Sexual desires in either sex are violent in some instances. General convulsions are frequent. They are generally clonic, and they are excited by any sudden impression, such as a current of air (aeriphobia), or vivid light, a startling noise, etc. Mucus accumulates in the throat, causing frequent efforts of expulsion. The salivary fluids are abundant, and flow from the mouth. The pulse becomes frequent and feeble. The face and surface of the body show capillary congestion. Death may take place suddenly in a violent spasm, or gradually by exhaustion.

---

[1] Bouley on Hydrophobia, translated by A. Liautard, M.D., New York, 1874.

The hydrophobic symptoms, in connection with the other clinical characters, are so distinctive as scarcely to leave any room for doubt in respect of the diagnosis. A person who has been bitten by an animal supposed or known to be rabid, may fancy a repugnance to liquids or inability to drink; but the hydrophobic element in cases of rabies is the spasmodic paroxysm excited by the attempt to drink, and the dread is, not of the water, but of the paroxysm which the effort of drinking excites. Pharyngeal spasm is one of the manifestations of hysteria; but it simulates the hydrophobic phenomena of rabies too imperfectly to be confounded with them, and, moreover, the concomitant symptoms point clearly enough to the hysterical character of the affection. A malingerer who undertakes to feign rabies could only deceive one whose knowledge of its clinical history is very slender. Some years since a patient was admitted into Bellevue Hospital who had practised this deception repeatedly with success upon popular audiences. He ventured upon a performance in the hospital amphitheatre in the presence of a large number of medical students and physicians. Sliding from the chair to the floor so as carefully to avoid any personal injury, he went through a series of frantic movements, imitating frequently very well the barking of a dog. He evidently had the vulgar notion that the latter was the striking feature of the disease. After his performance was over, the audience were informed that they had simply witnessed an attempt at imposition. The malingerer said nothing, but, shortly after retiring to the ward, managed to elope from the hospital, and was afterward heard of as exciting sympathy by his performance on steamboats, railway cars, and in other public places.

The difficulty of diagnosis relates to cases in which rabies exists without hydrophobia. It is generally agreed that there are such cases. They must be extremely rare. Probably tetanus has been sometimes confounded with rabies; yet tetanus has diagnostic characters which do not belong to rabies, exclusive of the hydrophobic phenomena, namely, trismus, opisthotonos, and constriction of the chest from spasm. On the other hand, the mental phenomena of rabies do not belong to tetanus. A case of much interest was reported by Dr. B. A. Watson, of Jersey City, N. J., in 1876.[1] This case was seen by the author in consultation. The patient had been bitten by a pet dog about ten weeks before his illness. The dog gave evidences of being rabid, and was killed. A servant girl in the family was bitten, and died undoubtedly of rabies, in St. Francis' Hospital, Jersey City. This case is reported in connection with Dr. Watson's communication. In Dr. Watson's case there was not distinct hydrophobia. There were, however, paroxysms of clonic spasm affecting the respiratory muscles, and ærophobia was marked. The patient recovered, and this fact, in connection with the treatment by curare, renders the case important. The most rational explanation, perhaps, of this case is, that the virus of rabies may produce the disease not only without hydrophobic phenomena, but so modified, as regards its gravity, as not to prove inevitably fatal. If the latter be not true, assuming that the disease was rabies, the case is unique in respect of the recovery, and is of very great value with reference to the success of the treatment.

---

[1] Am. Journ. of Med. Sciences, July, 1876.

Since this section was in press, the author has received the report of a case of supposed rabies treated successfully with curare by Dr. Offenberg, of Wickrath (Rhein preussen). The patient, a young woman, had been bitten by a Spitz dog evidently rabid. The hydrophobic and other symptoms characteristic of rabies in the case were well marked. The only hesitation in accepting the diagnosis arises from the fact that the patient had recently witnessed a fatal case of the disease in the family with which she lived. This fact may give rise to the suspicion that the disease was hysteria, with simulation of the phenomena of hydrophobia.

Curare was given hypodermically as follows: At 10.45 P.M., 0.02 (gr. $\frac{1}{3}$), and the same dose after fifteen minutes; at midnight, 0.03 (gr. $\frac{6}{13}$), and repeated twice after intervals of an hour; after two hours and thirty minutes the dose was again repeated, and again after two hours and twenty minutes.

These successive doses were followed by general paresis. Twice the respirations were suspended, but quickly restored by pressure on the abdomen and thorax. The paresis was not of long duration. The attacks of convulsions shortly ceased; the patient was able to drink without difficulty; and slow convalescence followed. Three months afterwards her health was completely restored, and she had resumed the occupation of a servant-maid.[1]

Another case reported as successfully treated with curare is cited in the *London Medical Times and Gazette*, December 1, 1877.

Treatment of Rabies.

There is no remedy the curative efficacy of which in rabies has been established. In the present state of our knowledge, a fatal ending of the disease is a rule, with very few, if any, exceptions. If in any case the nature of the disease be doubtful, recovery must be considered as weighing strongly against the correctness of the diagnosis. It is useless to enumerate the various remedies and therapeutical measures which have been tried and found inefficacious. The curare has just been mentioned as a remedy employed in cases of supposed rabies ending in recovery. The value of this remedy is to be determined by its employment in other cases in which the diagnosis admits of no doubt. In the case reported by Dr. Watson (page 609), one-sixteenth of a grain was injected subcutaneously at 2 A.M.; one-ninth of a grain at 5 A.M., and one-sixth at 8 A.M.; after which all unfavorable symptoms ceased.

---

[1] Geheilte Hundswuth beim Menschen, Ein Beitrag zu Kenntniss des Curare, von Dr. Ad. Offenberg, Practischer Artz in Wickrath (Rhein preussen). Bonn. 1879. Dr. O. in this brochure considers the grounds for considering the case one of veritable rabies. He also cites authorities for the use of curare in rabies and other affections. The case is reported with minute details. For a translation, without any abridgment, by Dr. S. W. Williams, *vide* the New York Medical Record, August 9, 1879.

The author subsequently saw another case of undoubted rabies in the practice of Dr. Watson, and in this case the curare was employed with no benefit. Neither in this, nor the previous case, was the remedy given to the extent of causing general paresis. It is plainly a duty, as opportunities offer, to persevere in making trial of this remedy, and of other as yet untried methods of treatment.

The palliative treatment consists of the administration *per enema* of opiates, chloral hydrate and the bromides. Some facts which have been contributed give promise that electricity may prove useful. If the patient cannot take liquids in any form, thirst may be alleviated by the injection of water into the rectum.

Preventive Treatment of Rabies.

The preventive treatment may be considered as embracing: 1st, an early recognition of the disease in dogs or cats, and then isolation; 2d, measures to avoid inoculation by the bite of a rabid animal.

It is a prevalent mistaken notion that dogs affected with rabies always give striking evidence of madness. As already stated, the virus may be received from an animal apparently well. In a case within the author's knowledge, the patient had been bitten by a dog which was offered to him for sale, and there was no suspicion of any illness. In another instance the bite was by a kitten which gave no evidence of being ill. Under such circumstances danger is not easily avoided. But the early manifestations of rabies in dogs and cats by no means denote a grave disease. With the common notion, what is known as madness is not suspected, and yet the virus is probably as virulent as at a later period when the animal is unmistakably mad. A medical friend of the author was called to see a woman who had been bitten by a cat. He desired to see the cat, and was told it was then under the bed on which the patient lay. On attempting to seize it, he was severely bitten. Fortunately, the wounded hand was gloved. The patient died, under his care, with rabies. His anxiety until sufficient time had elapsed to cover the extreme limit of the incubation period of the disease, can easily be imagined.

The importance of at once isolating dogs or cats whenever the least ailment is apparent, until either recovery take place or the nature of the malady is declared, should be impressed upon communities. And the popular diffusion of correct information concerning the early symptoms of rabies in these animals is obviously important. There is always ground for suspicion when the dog shows a change in habits or disposition, by not recognizing the attentions of his master, seeking solitude, restlessly going from place to place, and endeavoring ineffectually to sleep. Sudden starts and running or snapping at imaginary objects, denote hallucinations, and should increase suspicion. Refusal of food, a depraved appetite manifested by eating non-alimentary articles, gnawing wood, blankets, etc., are strongly indicative of the disease. It is an error to consider the fear of water as a diagnostic criterion. Rabid dogs often drink without reluctance or difficulty. Frothing at the mouth is by no means a constant symptom. The mouth, however, is often open, the lining membrane dry, and movements are made with the paws as if to remove an obstruction from the throat. A hoarse, low, prolonged, howling bark is a characteristic feature. Some dogs affected with rabies, however, never bark. An impulse to attack furiously dogs as they are met, and self-biting, belong to the history of rabies. In the height of the disease the animal ceases to recognize its master, paroxysms of rage alternate with a semi-comatose condition, the gait at length becomes staggering, and death takes place from asthenia and apnœa combined.

People should be instructed not to destroy dogs whenever there is a suspicion of their being mad. This is often done when the disease is not rabies. It must be an inexpressible comfort for persons who have been bitten to know that this disease did not exist. If a suspected dog be killed at once, the diagnosis must be based chiefly on what can be learned of the history. There are no post-mortem appearances to be relied upon as evidence that the animal was affected with rabies. The most significant fact is the presence in the stomach of non-alimentary substances, such as straw, pieces of cloth, earth, etc.

The early symptoms of rabies have been less studied in the cat than in the dog. The domesticity of the former is more quickly destroyed, and the ferocity is greater. The rabid cat is more dangerous than the dog, that is, it is more certain and quick to attack whoever may fall in its way. The cat, however, is impelled by the disease to flee its home, dying in solitude ; and there is protection in this fact.

To avoid inoculation when a person has been bitten, the first step is promptly to squeeze the blood from the wound and to employ suction with the mouth. This can be done by the bitten person if the wound be within reach ; if not, the danger to any one who is willing to perform this office is nearly, if not quite, *nil*. If practicable, the wound should be cupped. A tumbler or wineglass, the air being rarefied by a piece of burning paper, will supply the place of a cupping apparatus. If the wound be on one of the extremities, the circulation should be arrested by a ligature until free cauterization is practised. The most effective cauterization is made with iron heated to a white heat. Some iron instrument of suitable size and form should be found with as little delay as possible. The cauterization should be thorough and carried to the bottom of the wound. A method of cauterization said to have proved very effective in Hayti, where rabies is common, is to fill the wound with gunpowder and ignite it.[1] Caustic applications, namely, aqua fortis, oil of vitriol, lunar caustic, etc., are not likely to be at hand, and, moreover, they are less effective than to cauterize with the hot iron. The wound should not be allowed to heal quickly, but suppuration should be encouraged.

---

[1] *Vide* Bouley, op cit.

X.

LOCAL SPASMODIC DISEASES.

SPASM OF THE MUSCLES OF THE FACE. SPASM OF THE MUSCLES OF THE NECK. SPASM OF THE MUSCLES OF THE UPPER EXTREMITIES. ATHETOSIS. SPASM OF THE MUSCLES OF THE LOWER EXTREMITIES.

IMPORTANT local spasmodic affections have been considered in other sections, namely, spasm of the glottis, asthma, œsophagismus, and intestinal colic. In the affections to be here noticed, spasm is limited to certain of the muscles of the face, neck, and either the upper or lower extremities. They will be taken up according to this order of enumeration. Inasmuch as the parts affected are open to inspection, there is no difficulty in the way of diagnosis. It will, therefore, only be necessary to mention the different varieties of spasm in the situations just named. Moreover, to most of these varieties the general principles of treatment are alike applicable.

Since the article in this work on "Diseases of the Œsophagus" was printed (page 272), a remarkable instance of spasm of the œsophagus has fallen under observation. The patient, a native of South America, seventy years of age, of a highly nervous temperament, had for twelve years been subject to attacks of œsophageal obstruction from spasm, lasting sometimes for a few moments, sometimes for many hours, and, on one occasion, for four days. When he came under observation, the obstruction had been continuous for eight days. During this period, neither food nor drink had passed into the stomach. After swallowing either food or drink it was ejected, sometimes quickly; but, at times, it remained in the œsophagus for two or three hours. The spasmodic obstruction was evidently at the lower extremity of the œsophagus. Dry cupping to the spine, morphia and atropine by subcutaneous injection, had been resorted to without avail. He had been nourished by rectal alimentation. He suffered from thirst, and for twenty-four hours there had been no secretion of urine. The urine, examined prior to its suppression, gave no evidence of renal disease. A large-sized bougie was now passed, without much difficulty, into the stomach, and the patient was able immediately afterwards to take drink and nourishment. At the present time several weeks have elapsed without any return of the spasm.

SPASM OF THE MUSCLES OF THE FACE.

Clonic spasm of the facial muscles occurs in connection with neuralgic pain, constituting *tic douloureux*. Spasmodic paroxysms, however, are sometimes disconnected from neuralgia. From the grimaces which they occasion, and expressions imitative of laughter, and other mental emotions, they have been called "mimic or mimetic spasms."

The appearances are remarkable, varying according to the muscles affected. The variations in mimetic expression are marked during a paroxysm and in different paroxysms. Paroxysms may last for an instant or for several minutes, and they may recur after short or long intervals, being sometimes brought on by mental excitement or some voluntary exertion, and sometimes occurring without any appreciable cause. As the spasm is generally unilateral, the grimaces on one side of the face present a spectacle rendered more striking by contrast with the other side. What are called "pressure points" are spots in which pressure produces an inhibitory effect upon the spasmodic motions. They are found in different situations on the face, the back of the neck, and sometimes on the upper extremity. If they be found, a paroxysm may sometimes be arrested either by pressure or the galvanic current.

Tonic unilateral spasm is comparatively rare. This is to be distinguished from the muscular contractions due to paralysis of antagonizing muscles.

Clonic and tonic spasms may be restricted to a few muscles, or to a single muscle. They are not infrequently confined to the orbicularis palpebrarum (blepharo spasm). The eye may be closed by tonic spasm not only for minutes or hours, but even for weeks and months. Clonic spasms cause nictitation, which is common in hysterical patients, but occurs irrespective of hysteria.

In the foregoing varieties, the morbid agency is transmitted through the facial nerve. In spasm of the tongue, the transmission is through the hypoglossal nerve. As an isolated affection the latter is rare. It is a frequent element in epilepsy and epileptiform convulsions. The author has met with an instance of paroxysms of rapid projectile movements of the tongue. The patient was a young woman, who maintained for three years a position of the body bent far forward (emprosthotonos), except when she took a recumbent posture, which she was able to do without difficulty. The patient was also subject to paroxysms of rapid rotatory movements of the head. She did not manifest any of the ordinary symptoms of hysteria. She recovered from these different varieties of spasm.

Tonic bilateral spasm of the muscles of mastication gives rise to trismus or lock jaw. Exclusive of tetanus, of which it is a primary manifestation, it may occur as an isolated affection in hysteria. The author has met with a striking example. The jaws in this instance were firmly closed. The muscles were rigid and painful. The trismus occurred in paroxysms lasting sometimes a few minutes only, and sometimes for hours. It was unaccompanied by spasm of other muscles, but the patient was hysterical, and had kept the bed for a long period with a variety of imagined ailments. There were manifestations of nymphomania in this case.

Clonic spasm of the masticatory muscles causes, if unilateral, grinding of the teeth, and, if bilateral, the teeth to chatter. These are of frequent occurrence as symptoms, but they are not to be reckoned as spasmodic affections.

SPASM OF THE MUSCLES OF THE NECK.

Spasm of the muscles of the neck produces movements of the head, varying in direction according to the muscles affected. The head is moved laterally and the chin raised by spasm of the sterno-cleido-mastoid muscle on one side, as is seen in cases of torticollis. The occiput is drawn backward and downward by spasm of the trapezius. Nodding of the head and rotatory movements are produced by clonic bilateral spasm of the muscles of the neck. They may occur as isolated affections, either paroxysmal or more or less persistent, the recurrences of paroxysms, their duration, and the violence of the spasm, varying much in different cases.

The sterno-cleido mastoid muscle and the trapezius may be the seat of persistent tonic contraction, the treatment involving mechanical appliances, and, perhaps, a division of muscular fibres by the knife.

SPASM OF THE MUSCLES OF THE UPPER EXTREMITIES.

Spasm of the flexor muscles of the forearm is common in hysteria. Under these circumstances it can hardly be considered a local affection. It is, of course, not to be so considered when spasm occurs as an element in general convulsions, multiple cerebro-spinal sclerosis, and paralysis agitans. Writer's cramp, together with analogous forms of spasm, and athetosis, are affections which come under this heading. It should be added that both clonic and tonic spasms of certain of the muscles of an upper extremity occur irrespective of any of the foregoing pathological connections, depending sometimes on injuries or disease of the nerves, and sometimes being without any appreciable causation. The author has met with a case in which frequent paroxysms of unilateral clonic spasms of the muscles of the arm occurred in a patient affected with diabetes, no local cause being discoverable.

Writer's cramp is one of several kindred affections, the characteristics and the etiology being common to all. The development of the affection is gradual. A person into whose daily occupations writing largely enters, becomes sensible of an unusual effort and fatigue. After sometime, the requisite combination of movements becomes difficult, and the character of the chirography changes. At length, there is inability to write. In most cases the inability arises from involuntary, spasmodic movements whenever writing is attempted. These movements differ in different cases, according to the particular muscles affected with spasm. The complete loss of the ability to write may be postponed by various expedients relating to the manner of writing, the form of the pen, etc., these proving, sooner or later, ineffectual. In some cases there is this difference: The difficulty, and, at length, the inability to co-ordinate the necessary delicate movements appear to proceed from a temporary paralytic condition of the muscles. The term "scrivener's palsy," used by some authors, is appropriately applied to these cases. There is no practical utility in making formal varieties, and the term writers' cramp may embrace them all. The difficulty of diagnosis pertains only to the early period of the affection, before its characters are fully developed. An undue sense of effort and fatigue of the muscles employed in writing should excite apprehension, and as soon as there is difficulty in the co-ordination of movements, it is desirable for the affection to be recognized, inasmuch as promptly giving the muscles rest will, at least, prevent further progress. An analogous affection may be produced by the use of the fingers and hands in playing the piano-forte and the violin, in the occupation of the tailor or seamstress, the shoemaker, the blacksmith, and in milking. In each instance the distinguishing feature is the impairment or loss of the ability to perform the particular combination of movements required, other acts which call into exercise the same muscles, but not with the same co-ordination, being performed with little or no difficulty. With reference to the treatment, which will be considered presently, the causation is important. In every instance an essential factor is the long-continued use of the muscles which are co-ordinated for a special purpose, namely, writing, playing on the piano-forte, etc.[1]

Athetosis, first named and described by Hammond in 1871, is now recognized by most writers as a peculiar variety of local spasm. It is characterized by "the impossibility which the patients find of keeping their fingers and toes in any desired position, and by the continual movement of the same." It is confined to one side (hemiathetosis), or it is bilateral; the latter is extremely rare. The movements are involuntary, and continue when the patient is at rest. They may either continue or the fingers and toes remain in abnormal positions during sleep. Hemiathetosis, in a certain proportion of cases, is a concomitant of hemiplegia, the affection being on the paralyzed side. Hemianæsthesia generally coexists in these cases. When not associated with paralysis, symptoms are present which point to cerebral disease, so that a centric cause is to be inferred.

SPASM OF THE MUSCLES OF THE LOWER EXTREMITIES.

Athetosis affecting the toes is a local spasmodic affection of the lower limbs. As affecting either the upper or lower limbs, this is extremely rare. And with the exception of what is commonly known as cramps, localized spasm of the lower limbs is seldom observed save when obviously a symptom of hysteria, epilepsy, tetanus, chorea, or some affection of either the brain or spinal cord. In a case which came under the author's observation, the patient was awakened at night with movement of one foot and leg, continuing for some time with considerable violence. There was some mental confusion succeeding this attack, and paresis of the limb affected by the spasm, while there were no local causes discoverable; hence, a cerebral causation was inferred.

Cramps affecting especially the gastrocnemius are familiar to every one. Their frequent occurrence in pregnancy is well known. They constitute a prominent symptom in epidemic cholera. They are apt to follow over exertion of the muscles of the lower limbs in marching, dancing, and mountain climbing. They occur especially during the night. The spasm occurs in paroxysms which last a few moments, and occasion much pain. The affected muscle is prominent, hard, and rigid. Relief is usually obtained by brisk friction over the seat of the spasm.

---

[1] For an analysis of seventy-five cases of "writers' cramp," and impaired writing power, by George Vivian Poore, M.D., *vide* Transactions of the Royal Medical and Chirurgical Society of London, 1878.

Dr. S. Weir Mitchell has described several varieties of functional spasms, arranged under the following classes: "*First*, those in which the functional activity of a muscle or set of muscles gives rise at times to an exaggeration of the motions involved naturally, and sometimes also to more or less spasmodic activity in remoter groups. *Second*, those in which the functional action of one group results only in sudden and, possibly, in prolonged spasmodic acts, tonic or chronic, in remote groups of muscles not implicated in the original movement. And *third*, those in which standing or walking occasions general and disorderly motions affecting the limbs, trunk and face, and giving rise to a general and uncontrollable spasm without loss of consciousness."[1]

Treatment of Local Spasmodic Diseases.

In spasmodic affections of the face, local causes should be sought after in diseases of the teeth, gums, and jaws. These diseases, if existing, are to be appropriately treated. Examination should be made in the tract of the facial nerve to discover a tumor or neuritis, if present. If no local causes be found, cases are to be studied with reference to the evidence of intra-cranial disease. Aside from indications derived from affections of which the spasm may be supposed to be symptomatic, the objects of treatment are arrest or palliation of the paroxysms, and prevention of their recurrence. These are the direct objects whenever diseases just referred to are not discoverable, as is often the case. Pressure made upon the facial nerve, or over the supra-orbital, the infra-orbital, and the inferior maxillary divisions of the fifth pair, sometimes suspends the spasms. Other spots which may prove to be "pressure points," are to be sought after. If the paroxysms be violent or prolonged, the subcutaneous injection of morphia may be employed with success. Repeated according to the circumstances of each case, this measure may prove curative. Electricity, if the affections become chronic, is most to be relied upon for effecting a cure. Faradization and the continuous galvanic current have both been found useful. Each should be tried in obstinate cases, and continued for a long time before relinquishing their use as unsuccessful. Anæmia, if it exist, is to be treated. The spasms may be kept up by this morbid condition. Strychnia, the preparations of zinc and arsenic, are remedies which may be useful, and sometimes curative. Chronic facial spasms are apt to become, in spite of all kinds of treatment, a persistent, incurable affection.

---

[1] For an account of interesting cases illustrative of these varieties, *vide* Am. Journ. of Med. Sciences, October, 1876.

Writer's cramp and the analogous affections require, as a *sine qua non* in the treatment, complete rest as regards the particular acts with which the spasm is connected, that is, writing, playing on the piano-forte or violin, sewing, etc. The earlier all attempts to continue the particular acts are suspended, the better the prospect of cure. In other than these acts, the affected muscles may be exercised without injury, if not with advantage. Erb states that in cases which are at all severe or obstinate, there is little chance of recovery unless the patient can give up his occupation for six months or a year. Electricity is to be employed, and, according to the author just named, the galvanic gives decidedly more favorable results than the faradic current. If the general health be impaired, its re-establishment is an important object of treatment.

The treatment of local spasmodic affections other than those of the face, and of the affection just referred to, may be summarized as follows: Indications derived from supposed causes, either local or centric, are to be fulfilled, and those pertaining to general morbid conditions, *e. g.*, anæmia. Palliative measures are indicated in proportion to the violence and duration of spasm, the most prompt and effective measure being the hypodermic injection of morphia. Other less efficient palliatives are embrocations, anodyne and stimulating. The curative treatment embraces strychnia, zinc, quinia, arsenic, and *par excellence*, electricity.

XI.

NEURALGIC DISEASES.

CEPHALALGIA. HEMICRANIA. NEURALGIA OF THE FIFTH NERVE. CERVICO-OCCIPITAL NEURALGIA. LUMBO-ABDOMINAL NEURALGIA. LUMBO-FEMORAL NEURALGIA. SCIATICA. NEURALGIA OF THE GENITAL ORGANS AND COXALGIA. TREATMENT OF NEURALGIC DISEASES. MYALGIA.

A NEURALGIC affection is characterized by pain, usually in paroxysms, not dependent on inflammation or any appreciable structural lesion. It is, therefore, a functional affection, and, as such, belongs among the neuroses. Considering neuralgia as thus denoting a functional affection, the term cannot be correctly applied to pain however neuralgiform, and referable distinctly to a sensory nerve, *e. g.*, the trigeminus, if the pain be an effect of neuritis, inflammation in the neighborhood of the nerve, neuroma, or any appreciable extrinsic local cause. Under these circumstances, pain is symptomatic. It may be granted as probable, that neuralgia is always a symptom; if so, it is in the category of not a few symptoms which, in the existing state of pathological knowledge, are nosologically reckoned as individual affections. The term neuralgia is not synonymous with either hyperæsthesia or hyperalgesia. The latter terms denote an abnormal sensitiveness and susceptibility to, but not necessarily the existence of, pain. It is proper to add, that the term neuralgia is often, if not generally, used in a more comprehensive sense than that to which it is here restricted, embracing neuritis and lesions so situated as to affect nervous trunks. Neuralgia considered as a functional affection, is synonymous with the essential neuralgia of French writers.

Certain neuralgic affections have been already considered, namely, gastralgia and enteralgia, in connection with diseases of the digestive system, intercostal neuralgia following the consideration of pleurisy, and angina pectoris as incidental to diseases of the heart. The affections which will be embraced in this division of nervous diseases, are functional headache or cephalalgia, including hemicrania, and neuralgias referable to different nerves. The neuralgic affection constituting what is called commonly muscular rheumatism, may properly be considered in connection with the neuralgias.

The neuralgic affections have certain diagnostic features in common. The pain is described as darting, shooting, tearing or cutting. Its intensity varies from a slight degree to that sometimes characterized as atrocious. It is either paroxysmal, or there are notable remissions. The paroxysms or exacerbations vary in duration from a few minutes to several hours. The pain is controlled temporarily by opium. It is referred to a nervous trunk or its branches. Frequently the patient indicates correctly the situation of the affected nerve, and its distributions, by the directions of the shooting pain. If the pain be localized in a particular spot, this is apt to vary in different paroxysms. Shifting of the pain from one nervous trunk or branch to another, is highly diagnostic. A paroxysm or exacerbation is produced by movements of parts in relation with the affected nerve. Direct and strong pressure upon the seat of pain lessens its intensity, and instinctively the patient resorts to this method of obtaining relief. Generally there are certain circumscribed spaces which are sensitive to pressure. These are known as the "tender points," and they are especially marked where cutaneous branches are given off from the affected nerve. The situations of these points enter into the clinical history of each neuralgic affection. They have much diagnostic importance, but, as they are not constant, their absence is not proof against the neuralgic character of the affection.

Etiology furnishes some facts to be taken into account both in the diagnosis and the treatment of neuralgia. The affections are rare in infancy and childhood, and are most frequent after the middle period of life. The anæmic condition favors their occurrence; few persons with anæmia are altogether free from them. Malaria is a frequent cause, and not infrequently, when due to this cause, paroxysms recur according to the laws of periodicity belonging to the different types of intermittent fever. The thermometer, in these cases, may show more or less rise of temperature during the paroxysms. The toxic agency of lead is another cause. The so-called lead colic is, in fact, neuralgic, and, either without or with this manifestation, neuralgia may be produced in other situations.

The diagnosis of a neuralgic affection requires the exclusion of inflammation and structural lesions. Neuralgia, no matter how intense may be the pain, does not give rise to fever. Except it be associated with a febrile affection, the temperature of the body is not raised. This fact excludes inflammation. Of course, a neuralgic and an inflammatory affection may coincide, but the respective localization of each and other circumstances generally render it easy to decide that the two affections are associated by coincidence and not by a pathological connection. Examinations are to be made in the course of the affected nerve, in order to exclude neuritis or any discoverable local affection. A tumor or some other local cause may exist in situations not open to examination, namely, the abdomen or the spinal cord. These will be likely to give rise to symptoms other than neuralgic pain, namely, paralysis, spasm, and more or less impairment of the general health. Neuralgia does not interfere materially with appetite, digestion, nutrition, and muscular strength. Complete intermittency of pain for a greater or less period, is a strong point in favor of the diagnosis of neuralgia.

Proceeding to notice particular neuralgic affections with regard to the diagnostic points proper to each, they will be considered afterward, collectively, in respect of treatment. An exception will be made of the first affection to be noticed, namely, cephalalgia. The treatment of this affection will be considered after the diagnostic characters have been presented.

CEPHALALGIA. HEMICRANIA.

Headache is a symptom in a large majority of diseases. It is rarely absent in acute inflammations and the essential fevers. It is more or less marked in most of the intra-cranial affections. It is one of the toxical effects of uræmia. It follows alcoholic intoxication, and is an after effect of opium. It accompanies frequently disorders of digestion. In all these instances it is obviously symptomatic. It is to be considered as a neuralgic affection only when it is apparently functional, and not a symptom of any of the numerous and varied diseases with which it is apt to be connected. Thus restricted, the term cephalalgia denotes, generally, a paroxysmal affection which seems to involve a constitutional predisposition limited to a certain period of life, and which often persists in spite of efforts to effect a cure. This definition does not embrace transient headaches which are extremely common, usually produced by some obvious cause, such as exposure to impure air in close or crowded rooms, etc.

In making the diagnosis of neuralgic, commonly called nervous, headache, certain causative conditions, not at once apparent, are to be sought after and excluded. Syphilitic periostitis is one of these. Disease of the kidneys, giving rise to uræmia, is another. The headache is not to be confounded with neuralgia of the supra-orbital or of the cervico-occipital nerve. The exclusion of these and other affections requires care only before the cephalalgia has become habitual or a chronic affection. In most instances, when patients come under observation, the duration of the affection and the previous history suffice for the diagnosis.

The paroxysms of pain are often preceded by a general feeling of malaise, and certain sensations which the patient, from past experience, knows to be premonitory. The pain varies greatly in intensity and character in different paroxysms. It is sometimes extremely severe and almost unbearable. Patients describe it as lancinating, boring, bursting, etc. It may be diffused, or localized in different situations, namely, the frontal, occipital, or temporal regions. It may shift from one to another of these regions. In severe paroxysms there is morbid acuteness of the sense of sight and hearing; the patient cannot tolerate light or sounds. The exercise of the intellectual faculties is almost an impossibility. Movements of the head, straining, stooping, coughing and sneezing, occasion an increase of the pain. The face may be at times pale, and at times flushed. The eyes are sometimes reddened and watery. Nausea and vomiting often occur. The pulse is generally small, its frequency not increased, but sometimes diminished. The patient often passes, in abundance, pale urine.

A paroxsym may last for a few hours only. Its duration is generally from twelve to twenty-four hours, but sometimes it extends over several days. It is followed by refreshing sleep. In some cases the mental faculties and spirits are clearer and more buoyant after than before the paroxysm. In the intervals between the paroxysms, there are no symptoms pointing to cerebral disease. The paroxysms recur after variable periods in different cases, and, not infrequently, in the same case. The intervals may be days, weeks, or months. In many instances a paroxysm seems fairly attributable to some exciting cause, such as imprudence in eating or drinking, mental excitement, loss of sleep, etc.; but in not a few instances the occurrence is apparently spontaneous.

There is a variety of habitual headache in which the patient professes to have had pain in the head constantly for weeks, months, and years, the pain never intense, but sufficient to occasion more or less annoyance. The author has met with several cases of this kind, and made trial of a variety of remedies always without success. The apparently good health in other respects, the exemption from any appearance of suffering, and the fact that patients are not prevented from sleeping, have led to the suspicion that these cases are examples of either a delusion arising from introspection, with an expectancy of pain, or of a voluntary exaggeration.

The peculiar variety of headache which occurs in hysterical patients, is, undoubtedly, neuralgic. In this variety the pain is localized in a particular spot, and the patient describes the sensation by comparing it to that which it is imagined would be produced by driving a nail into the head; hence the name *clavus hystericus*. Patients make this comparison of their own accord. Well marked examples of this variety of headache in cases of hysteria, are by no means common. It probably does not occur except in that pathological connection.

Hemicrania (megrim migraine) is a variety of which the chief distinguishing feature is the limitation of pain to one side of the head. Aside from its unilateral character, the account which has been given of paroxysmal cephalalgia will apply to this variety. Hemicrania occurs much oftener in women than in men, and paroxysms are apt to be coincident with the menstrual period. A comparison of the two sides of the head during a paroxysm, shows, in some cases, pallor and diminished temperature, and in other cases, redness and increase of heat on the painful side. This variety, like bilateral cephalalgia, rarely occurs under the age of adolescence, and it is rarely developed after twenty-five years of age. In both varieties the affection often, but not always, spontaneously disappears after about the age of forty years.

Treatment of Cephalalgia.

The treatment of this affection is of two kinds, namely, palliative or abortive and curative or preventive. A paroxysm may sometimes be cut short by a saline laxative, taken as soon as the paroxysm begins. This treatment will not always succeed, but that it is sometimes effective the author knows from personal experience as well as observation. A full dose of quinia sometimes arrests a paroxysm, or, if this effect be not produced, the duration may be abridged. The bromides in some cases either render a paroxysm abortive, or diminish the pain and shorten its continuance. An opiate is sometimes followed by these effects. Caffein, or the remedy recently in vogue, guarana, the author has known to succeed in either cutting short or palliating an attack; but it often fails in both. In the same case, at different times, it sometimes succeeds and sometimes fails. Ergot or ergotine is said to prove successful as an abortive and palliative remedy when the symptoms show an undue determination of blood to the head, and the inhalation of the nitrite of amyl when the symptoms show an opposite condition. The value of these remedies is to be determined by further experience. Both faradic electricity and the constant galvanic current have been employed with success in the abortive and palliative treatment. Beard and Rockwell state that electrization "sometimes relieves, sometimes aggravates, and sometimes gives only negative results." The carbonate of ammonia and the spirit of mindererus will sometimes arrest or palliate a paroxysm. Palliative measures less potential than the foregoing, but more or less useful, are cold applications to the head in some, and of cloths wrung out in water as hot as can be borne in other, cases. A sinapism to the back of the neck and stimulating foot baths afford some relief. Strong coffee or tea are among the minor palliatives, and also various hot drinks which promote perspiration. Forced mental exertion may bring a paroxysm to an end. The author has lectured when, from the intensity of pain, it was difficult to rise from the bed, and the paroxysm has ended before the conclusion of the lecture.

The curative or preventive treatment requires the avoidance, as far as possible, of exciting causes, and the removal of associated affections which may be supposed to favor the recurrence of the paroxysms, *e. g.*, anæmia. It is, however, to be considered that the paroxysms involve an internal unknown pathological condition, in this respect resembling epilepsy. It is often a mistake to attribute the affection to disorders of digestion. A restricted diet, so far from being curative, often renders the paroxysms more frequent. An abundant alimentation and assimilation are desirable. Patients should not be placed on a low diet; but dietetic excesses, the abuse of alcoholics, the immoderate use of tobacco, together with other violations of hygiene, undoubtedly increase the liability to paroxysms, and in some instances act as exciting causes.

Nux vomica is in some cases an effective remedy. The author can testify to its effectiveness, not as a rule, but exceptionally. Small doses should be continued steadily for a considerable period; and, if it succeed, it may be discontinued, to be resumed if the paroxysms return. Arsenic is sometimes curative. It should be given in small doses and without increasing the dose. Erb strongly recommends a combination of quinia, in doses of a grain and a half, with three-fourths of a grain of powdered digitalis, taken every morning for a considerable period. Trial should be made of the preparations of zinc and belladonna. Curative or preventive treatment should not be abandoned without a fair trial of electricity. All late writers on nervous diseases recommend the employment of this remedy. The electrical treatment is not to be considered as unsuccessful without the trial of both the galvanic and faradic current, and in the different modes of application. Beard and Rockwell advise a persevering use of general faradization and central galvanization.

Travelling and a change from sedentary to active habits of life may succeed when medicinal remedies fail. Patients may be encouraged to expect a spontaneous cure after the age of forty years.

NEURALGIA OF THE FIFTH NERVE.

Neuralgia affecting this nerve (prosopalgia) is generally manifested in one of its three great divisions, and is almost invariably unilateral. It may affect all the branches of a division or be limited to a particular branch. Affecting the supraorbital division, the pain is referred to the forehead and the upper eyelid. The eye is tender, the conjunctiva reddened, and lacrymation abundant during a paroxysm. There is tenderness on pressure over the supraorbital foramen, and at other points in the area of the distribution of the branches of this division. Erb states that supraorbital neuralgia is the form most frequently resulting from exposure to cold, and is almost the exclusive seat of malarial neuralgia; hence it is often of short duration and amenable to treatment. In the diagnosis of neuralgia in this situation, inflammation within the frontal sinus and syphilitic periostitis are to be excluded.

When the infraorbital nerve is the seat of the affection, the pain is referred to the cheek, the teeth of the upper jaw, and the upper lip. The tender points are over the infraorbital foramen, on the gums, and the upper lip. Within the nostril on the affected side, during a paroxysm, the membrane is abnormally red, its temperature raised, and there is more or less increase of the secretion of mucus. In the diagnosis of neuralgia in this situation, inflammation within the maxillary sinus is to be excluded.

Seated in the inframaxillary division, the pain is referred to the teeth of the lower jaw, the lower lip, and the chin. There is tenderness over the mental foramen, and tender points may be found on the lower lip, the lateral surface of the tongue, and the gums of the lower jaw. Salivation accompanies the paroxysms, and the tongue becomes furred on the affected side.

The paroxysms of facial neuralgia vary, within wide limits, in different cases, as regards their severity, duration, and frequency of recurrence. The affection may be mild, or, on the other hand, one of the most distressing of the "ills that flesh is heir to." A form distinguished for its severity and intractability is the classic *tic douloureux*. In this form, intense darting pains, lasting but a second, recur at variable intervals, sometimes in quick succession, for hours, days, months, and even years. Generally there are periods of exemption of variable duration, but permanent recovery is a rare exception to the rule. The name epileptiform neuralgia, given to this form by Trousseau, derives its significance from a strained analogy. There are more points of difference than of resemblance between it and a paroxysm of epilepsy, nor is there any ground to suppose that the underlying pathological condition is the same in both. The name tic douloureux signifies a painful spasm, and would imply that the pain was incidental to a spasmodic affection, whereas the truth is the reverse, that is, the spasm is a symptom of the neuralgic affection. Mimetic spasms accompany each attack of pain. These are to be distinguished from the voluntary grimaces which the pain may occasion. The tic consists of truly spasmodic or involuntary movements.

Cervico-occipital Neuralgia.

In this division the neuralgia is seated in one or more of the sensory fibres of the first four cervical nerves, generally of the second of these, namely, the *nervus occipitalis major*. The affection is not infrequently bilateral. Pain shoots from the back of the neck upon and over the posterior and lateral portions of the head; it may extend to the ear, the anterior portion of the neck, the clavicles, and the scapula. The tender points are between the mastoid process on the cervical vertebræ; on the mastoid process, over the parietal bone, and at the *meatus auditorius*. Myalgia or muscular rheumatism affecting the muscles of the neck is to be excluded. This is not difficult. The latter affection causes pain whenever the affected muscles are in action, whereas movements of the head in neuralgia are painful only during the paroxysm. There is tenderness over the entire muscle or muscles affected with myalgia or muscular rheumatism, whereas in neuralgia the tenderness is limited to the tract of the affected nerve and certain circumscribed spots.

Cervico-brachial Neuralgia.

The sensory branches of the four lower cervical nerves, and the first dorsal nerve, are the seats of pain in this group of neuralgic affections. The directions of the shooting pain correspond to the several divisions of the nerve, namely, the musculo-cutaneous, radial, median, and ulnar. Of these several divisions the one last-named is oftenest affected. The diagnosis of the functional affection involves the exclusion of wounds, neuroma, and other appreciable local causes; also of vertebral lesions.

Tender points are found near the cervical vertebræ, in the neighborhood of the acromial end of the clavicle, over the deltoid muscle, in the axilla, at the inner end of the condyle of the humerus, and near the lower end of the ulnar and radius.

Lumbo-abdominal Neuralgia.

The nerves affected in lumbo-abdominal neuralgia are the branches of the lumbar plexus distributed to the hypogastrium, inguinal region, labia, scrotum, and the spermatic cord. The pain is referred to the back, generally on the left side, and extends to the parts just named. Lumbago is excluded by the differential points mentioned in connection with the preceding neuralgic affections. Neuralgia may be limited to the spermatic cord. A patient who consulted the author suffered from paroxysms of severe pain in this situation. As he lived in a highly malarious district, an opinion had been given that the affection might be due to malaria. To the patient this seemed an absurdity; he was, however, cured by full doses of quinia. Tender points in cases of lumbo-abdominal neuralgia are to be sought after near the lumbar vertebræ, on the crest of the ileum, above the symphysis pubis, and on the scrotum or labia.

Lumbo-femoral Neuralgia.

This name may be applied to neuralgia affecting, separately or collectively, the branches of the lumbar plexus which are distributed to the lower extremities, the largest branch being the crural nerve. Affecting the crural nerve, the pain is referred to the anterior aspect of the thigh, and extends along the inner surface of the leg toward the great toe. The tender points are over the nerve in the groin, on the inner side of the knee, at the ankle joint on its upper surface, and at the joint of the great toe. Affecting the external cutaneous nerve, the pain extends along the outer and the posterior aspect of the thigh. A tender point is on the anterior superior spinous process of the ilium. Affecting the obturator nerve, the pain extends along the inner surface of the thigh. Pain is referable to this nerve in cases of obturator hernia.

Sciatica.

Neuralgia affecting the sciatic nerve is of frequent occurrence. Of the neuralgic affections now under consideration, sciatic and facial neuralgia occur more frequently than all the others. In this statement intercostal neuralgia is not embraced. This neuralgic affection is by no means infrequent. The pain in sciatica is referred to the posterior part of the thigh, shooting down to the gastrocnemius muscle, and thence on the external aspect of the leg and foot. The course of the pain, as delineated by the patient, corresponds to the distribution of more or less of the branches of the sciatic nerve. Tender points are situated on the sacrum, at the sciatic notch, behind the trochanter major, in the popliteal space, on the external aspect of the patella, at the articulation of the tibia and fibula, over the lower and posterior part of the external malleolus, on the upper part of the sole of the foot. The tenderness is present at more or less of these points according to the number and extent of the nervous branches involved. Here, as in the diagnosis of other neuralgic affections, muscular rheumatism is to be excluded by reference to the same differential points, namely, the limitation of pain and soreness to one or more muscles, the occurrence of pain with certain movements, and freedom from pain when the muscles are at rest. Disease within the hip-joint is to be excluded by the absence of its characteristic symptoms. It is not always so easy a problem to determine that the affection is functional by excluding intra-pelvic disease. In the great majority of the cases in which this question arises, functional neuralgia exists.

The instances are few in which sciatica is persistent and incurable; but such instances occur. Although recovery is the rule, it is never prudent to hold out much encouragement to expect this result within a period of several weeks.

NEURALGIA OF THE GENITAL ORGANS AND COCCYALGIA.

Neuralgia affecting the spermatic cord has been already noticed (page 625). The penis is sometimes the seat of a neuralgic affection. In connection therewith there may be notable irritability of the urethra. Pain referable to the coccyx is, in certain cases, neuralgic. This affection is almost exclusively observed in women. In the diagnosis of neuralgia in these situations, vesical calculus, diseases of the bladder, and affections of the anus or rectum, are to be excluded.

Treatment of Neuralgic Diseases.

Intense pain furnishes often a primary and pressing indication for treatment in cases of neuralgia. Relief is to be procured in these cases by opiates. It is undoubtedly obtained most promptly and efficiently by the hypodermic method of administration. There is a consideration, however, never to be lost sight of in the employment of this method. It is apt to be peculiarly attractive to patients, and many readily become victims to its seductive influence. It is a judicious rule never to suggest, nor to encourage, the use of the hypodermic syringe in the hands of the patient. This rule is applicable to all affections accompanied by pain. So many instances in which persons have become addicted to the use of opiates in this way, with the sacrifice of mind, health, and life, have come under the author's observation, that he has been led to doubt whether, on the whole, the evils have not outweighed the advantages accruing from the greater promptitude and efficiency of subcutaneous injections for the relief of pain. Relief in paroxysms of neuralgia may be counted on with certainty, although with more or less delay, from the administration of opiates by the mouth or rectum. The galvanic current, next to opiates, is a prompt and efficient means of obtaining relief, and, when available, this is to be recommended as exempt from the after-effects, and the danger just alluded to, of opiates. Bartholow has found the injection deeply in the neighborhood of the affected nerve of from five to fifteen minims of pure chloroform an effective palliative measure. An abscess is an occasional effect. This author states that he has procured permanent relief in cases of long standing by this measure. Gelsemium has been found in some cases, especially of neuralgic pain affecting the teeth and alveoli, an effective palliative. The tincture may be given in doses of from fifteen to twenty minims, repeated in an hour or two, if required. Sinapisms and fomentations are useful as auxiliaries when the intensity of pain calls for either opiates or electricity in the palliative treatment. When the paroxysms are not severe, these, together with other local applications, namely, opium in a liquid form or ointment, chloroform, veratrum, aconite, and belladonna, will suffice for palliation. To enjoin complete rest of the parts which are in immediate relation to the affected nerves, is simply to follow the dictates of the instinct and the experience of the patient.

The hydrate of chloral, either alone or in combination with small doses of an opiate, may secure the desired palliative effect, if the paroxysm be not severe. Belladonna, or atropine, given internally, will sometimes suffice. Bartholow states that the croton-chloral is especially useful in tic douloureux, given in doses of two to five grains every hour or two until fifteen grains have been taken. This amount at one time should not be exceeded.

To prevent the recurrence of paroxysms is to effect a cure. Preventive and curative treatment are, therefore, convertible terms. Prevention and cure involve the trial of certain remedies and local measures, the removal of associated morbid conditions, and hygienic measures.

Of medicinal remedies, quinia is most likely to prove successful. The success of this remedy may be counted upon if, from periodicity and other circumstances, the affection be attributable to malaria; but the remedy is successful in not a few instances when there is no ground for the suspicion of a malarial causation. A fair trial of this remedy requires that it be carried to the point of slight cinchonism, and continued in doses necessary to maintain this effect for ten days or a fortnight. Generally, in adults, from fifteen to thirty grains daily are requisite. Next to this remedy in efficiency is arsenic. It should be given in doses which are well tolerated, and, in order that it may be continued for a considerable period, the doses should not be increased. It should not be abandoned as unsuccessful without its having been continued for several weeks. Writers of ample experience in electro-therapeutics agree in bearing testimony to the curative efficacy of electricity in neuralgic affections. A cure is sometimes effected so quickly as to seem almost magical. Notable benefit is in some cases derived from this remedy, although it fails to effect a cure. The testimony is pretty uniform as to the galvanic being more effective than the faradic current. For details relating to the employment of electricity in these, as in other nervous affections, the reader is referred to treatises which are devoted to this important department of therapeutics, and, also, to works treating specially of diseases of the nervous system.[1] Other remedies which experience has found useful are turpentine, the preparations of zinc, strychnia, the iodide of potassium, phosphorus, and the bromides. These may be tried in succession, if the remedies previously named prove unsuccessful. They are severally curative or serviceable in a very much less proportion of cases than quinia, arsenic, and electricity.

---

[1] Dr. V. P. Gibney has reported fifteen cases of sciatic neuralgia, in eleven of which a cure was effected exclusively by galvanism, very strong currents having been employed, *vide* paper read before the New York Academy of Medicine, and published in the American Practitioner, March, 1879.

The treatment by counter-irritation is frequently effective. Dry cupping, a series of small blisters, and the application of a hammer heated by hot water or firing, are mild measures which may be first tried. In cases which resist these and the remedies which have been mentioned, cauterization with the hot iron is a measure from which, according to Valleix and others, success may in many instances be expected. The cauterization should be superficial, care being taken to avoid producing deep eschars. The tender points which enter into the diagnosis are to be selected in the employment of these different methods of counter-irritation.

Various associated pathological conditions, namely, gout, rheumatism, lead poisoning, syphilis, dyspepsia, may sustain, in a greater or less degree, a causative relation to neuralgia. The removal of either of these is an important object of treatment. Anæmia is often associated, and is especially causative. The neuralgia not infrequently disappears when this condition is removed; hence, preparations of iron seem sometimes to have a direct curative influence upon the neuralgic affection. A nutritious diet and good digestion are always desirable in cases of neuralgia; and in this connection may be mentioned the usefulness of cod-liver oil if it be well tolerated.

The hygienic treatment in cases of neuralgia is essentially important. Violations of the laws of health are apt especially to tell upon the nervous system, contributing to the causation of neuralgic and other affections of this system. It is an essential part of the treatment to discover the sanitary faults in particular cases, and point out the necessity of reforms. The excessive use of tobacco, abuses of alcoholics, excesses in diet, late hours, over-exertion of mind, sexual errors, sedentary habits, are embraced in the list of possible, if not probable, causes which, if possible, are to be removed. But hygienic treatment may be carried to an injurious extreme. It is injudicious to enjoin in all cases abstinence from alcoholics, a low diet, the giving up of tea or coffee, the relinquishment of intellectual pursuits, etc. The golden mean here, as in many other instances, is to be sought after; in order to find it, experience and judgment on the part of the physician are needed, and to follow it, good sense and resolution are requisite on the part of the patient.

Division of the nerve to which the pain is referred (neurotomy), and the removal of a section of it (neurectomy) are measures of a last resort in cases of neuralgia affecting the branches of the trigeminus. These measures may secure exemption from pain for a long period, and sometimes they effect a permanent cure. Stretching of the nerve is another measure, the consideration of which, as of the operations previously named, belongs to surgery.

MYALGIA.

Under this name may be embraced cases of the affection known as muscular rheumatism. The latter name is a misnomer, and tends to keep up erroneous practical ideas. The affection is as distinct from acute articular rheumatism or rheumatic fever, as acute peritonitis from enteralgia. The two affections differ *in toto* as regards clinical history, and neither the etiology nor pathology furnishes any ground for a doctrine of identity. The affection certainly, in most of the cases of so-called muscular rheumatism, is a neuralgia, and it is desirable to substitute a name expressive of its character. The term myalgia has this signification. The suffix, *dynia*, has derivatively the same sense as algia, and is, therefore, appropriate. The addition of the former of these to names denoting the situations of the myalgia, as was done by Valleix, makes a correct and convenient terminology for designating particular myalgic affections. It would be a positive advance in medical nomenclature if terms such as rheumatism, gout, catarrh, and croup, which are either superfluous or express false pathological ideas, were allowed to become obsolete.

Myalgia may affect any of the muscles of the body. This statement doubtless holds true of the involuntary, as well as the voluntary, muscles. Certain of the visceral neuralgias are probably myalgias. Practically, this distinction cannot be made, nor is it of any practical importance. Myalgia affecting the voluntary muscles is generally easily recognized, these being accessible to examination. The arrangement by Valleix of groups of muscles as seats of different myalgic affections, has been generally adopted by other writers. It is as follows: 1. The muscles of the head—the occipito-frontal, temporal, masseter, and the muscles of the eye (Myalgia Cephalica). 2. The cervical muscles (Cervicodynia, Myalgia, Cervicalis, Rheumatic Torticollis). 3. The dorsal muscles (Dorsodynia). 4. The lumbar muscles (Lumbodynia, Lumbago, Myalgia Lumbalis). 5. The thoracic muscles (Pleurodynia, Myalgia Pectoralis, Pleuralgia). 6. The scapular muscles (Scapulodynia, Myalgia Scapularis, Omalgia). 7. The abdominal muscles (Myalgia Abdominalis). 8. The muscles of the extremities.

Myalgia occurs as an acute, a subacute, and a chronic affection. In acute myalgia severe cramp-like pain is referred to the affected muscle or group of muscles, whenever muscular contraction is excited. If the affected muscle or muscles be perfectly at rest, there is little, comparatively, pain. Every one is familiar with the character of the pain, who has experienced what is commonly known as a crick in the back or in the neck (cervical myalgia and lumbago). There is usually some tenderness on pressure, confined to the muscle or muscles affected, and uniformly diffused within this limitation, that is, not in disseminated points. Firm pressure or compression may afford relief, as in other forms of neuralgia. None of the local symptoms of inflammation are present, exclusive of pain and tenderness, and there is little or no fever. The acute affection almost always ends after a duration varying from a few hours to a week. The subacute affection differs in the lesser intensity of the pain. The affection may be of short duration, but not infrequently it becomes chronic, persisting for weeks and months. Lumbar myalgia or lumbago is the most frequent of the different myalgic affections. As a subacute affection it is of frequent occurrence.

The diagnosis involves differentiation from neuralgia affecting nervous trunks. The localization of the pain in a muscle or a particular group of muscles, the fact that tenderness is diffused within the boundaries of the affected muscle or muscles, and not limited to certain spots, are diagnostic points which are positive as regards the myalgia, and negative as regards the form of neuralgic affections from which it is to be differentiated. Local inflammation is excluded by the absence of continuous pain, swelling, or redness, and of fever, with other constitutional symptoms.

Treatment of Myalgia.

The general principles of treatment are the same as in other neuralgic affections. If the pain be severe, it calls for opiates. A more prompt and efficient relief is procured by the hypodermic method of administration, than when it is given by the mouth or rectum. Remarks already made respecting the use of opiates hypodermically, are here applicable (*vide* page 626). Anodyne applications to the seat of the pain are useful, and in mild cases these suffice. Sinapisms relieve the pain. Shampooing is sometimes followed by notable relief and a speedy cure. A popular mode of treatment is to apply over the muscles a heated iron, several thicknesses of flannel being interposed. This is called "ironing out the crick." Electricity is often promptly efficacious. Full doses of quinia are perhaps as often curative as in other neuralgic affections. In chronic cases, arsenic and other remedies which are curative in other forms of neuralgia should be tried. In other respects, namely, the removal of associated pathological conditions and hygienic measures, the treatment already considered (*vide* page 627) is alike applicable. Alkalies, given under the false idea that the affection is allied to acute articular rheumatism, are not indicated, and do harm rather than good.

XII.

FUNCTIONAL DISEASES (NEUROSES) NOT INCLUDED IN THE FOREGOING GROUPS.

HYSTERIA. ALCOHOLISM. DELIRIUM EBRIOSUM. DELIRIUM TREMENS. DIPSOMANIA. VERTIGO. MELANCHOLY AND HYPOCHONDRIASIS. NERVOUS EXHAUSTION. SLEEPLESSNESS. SPINAL IRRITATION.

FUNCTIONAL affections which have not been noticed, or not fully considered, are hysteria, alcoholism, vertigo, melancholy and hypochondriaism, nervous exhaustion, sleeplessness, and spinal irritation.

HYSTERIA.

The name hysteria denotes a functional affection with manifold phases, connected by a common underlying pathological condition, the varied manifestations of which occur not infrequently, either combined or in succession, in the same case. The name hysteria is singularly inappropriate. It implies that the affection is peculiar to women, which is far from the truth, and, when occurring in women, the sexual system is by no means always involved, nor, when involved, is the uterus necessarily the seat of disorder. Obvious as is the fact that the name is a misnomer, it would be an act of temerity for any one to undertake the substitution of another, and, moreover, it would not be easy to propose a term expressing satisfactorily the character of the affection.

The more marked of the manifestations of hysteria have been considered, namely, hysterical convulsions and coma, paralysis, spasm of the glottis, and other local spasms. It remains to consider the hysterical condition as represented by its mental characteristics. These are often useful in the diagnosis of the manifestations which have been considered, and they are often present without the latter. The diagnosis of the hysterical condition is not only important when it exists alone, but it is frequently an element in different diseases, when it is desirable to recognize it, and accord to it due weight in the interpretation of symptoms.

The hysterical condition may be defined, a morbid susceptibility to emotional disorder, and the loss or impairment of self-control. Excessive emotions occur without adequate exciting causes, or when there is no apparent causation, and the patient is unable to exercise that inhibitory influence of the will, which, normally, prevents emotional manifestations, and, to a certain extent, holds in subjection the emotional sentiments. In the hysterical condition the mind is abandoned, partially or entirely, to an irregular and unrestrained domination of morbidly excited sentiments. It is a real, not an imaginary disease. It is a psychical affection, involving mental causes, namely, congenital tendency, heredity, faulty education, defective discipline and imitation; but, also, in no small measure dependent often on physical disorders.

Symptomatic characters of the hysterical condition are immoderate laughter, but more frequently violent weeping, screaming, and other evidences of distress or even despair, when there are no circumstances to call forth these emotions. The real agony of a hysterical patient offers a singular contrast to the absence of emotional manifestations often when persons experience a great calamity such as the death of near relatives, the loss of property, and even when the doom of death is pronounced by the physician or in a court of justice. A patient may suffer indescribably during a hysterical paroxysm, who endures with admirable fortitude the real trials, however great, which are incident to human life. Persons of strong mental powers may be subject to hysteria. In the hysterical condition their reasoning faculties are temporarily in abeyance; arguments are useless, and efforts of consolation fruitless. It is an injustice to suppose that hysterical patients are necessarily weak-minded. Every physician of much experience must be aware of the fact that persons of superior mental endowments may be subject to this affection.

As regards duration, the hysterical condition has no laws of limitation. It may last for a few moments or hours only, and it may continue for weeks, months, years, or even during life. Its intensity varies within wide limits, an extreme degree being on the confines of insanity, into which it may become merged. The forms of mental disorder are very variable. It may take the form of pathophobia. The patient bases on certain sensations the apprehension or the conviction of the existence of some serious disease. A particular disease is sometimes fixed upon. For example, a highly intelligent and sensible woman was convinced that she had a cancer of the breast, although nothing abnormal could be seen or felt. The opinions of different physicians at different times disabused the mind, temporarily, of this idea, until at length, after many months, it disappeared, and did not return. It is not uncommon for patients to believe that they have a tape-worm, or some living animal in the alimentary canal. In other cases there is a belief in the existence of some disease without a definite idea as to its nature. A patient may keep the bed for years under an honest belief that there is inability for the exertion of getting up, or that the effort would be attended with danger, when the absurdity of this belief is apparent to the non-medical observer. In a case of this kind under the author's observation, the patient, a highly religious woman, derived consolation and satisfaction from the feeling that she was a shining example of sublime resignation. It would be easy to cite examples illustrative of the diversity of forms which the hysterical condition assumes in this direction. Other calamities than disease may be apprehended, and exaggerated feelings excited by events of trivial import. A jealous disposition is liable to become so intensified as to lead to violent or absurd extravagances of conduct. Indifference as to deportment and language distinguishes some cases. Patients talk incoherently and immodestly, using words and giving expression to ideas by gestures as well as conversation, in striking contrast to their habitudes of health.

As an element often entering into various diseases, the hysterical condition leads to an exaggeration of the subjective symptoms, or a description of imaginary sensations. A certain degree of allowance is always to be made for this condition in judging of the symptomatic history as given by the patient. Anomalous symptoms, that is, those not belonging to the symptomatology of the disease, whatever it may be, are often referable to the hysterical condition, and should lead to the recognition of this associated element. It is often of much importance to recognize this element and appreciate the extent to which it enters in different diseases, with reference to diagnosis, prognosis, and treatment. In these regards the sagacious and experienced practitioner in consultation proves sometimes to be a most useful coadjutor of the young physician.

It is customary to impute malingering and deceptions in certain cases to hysteria. The propriety of this may be called in question. Hysterical patients may feign diseases, and attempt to practise impositions, but these acts are not attributable to the hysteria. They are for the purpose of exciting sympathy, becoming objects of interest, teazing or worrying others, securing advantages from motives of pity, and sometimes apparently from sheer deviltry. These objects have no necessary connection with the hysterical condition. When the Fox girls were convicted of imposition in making joint-knockings, which they claimed were supernatural, after a challenged investigation in the presence of a committee of citizens, the chief performer went into a hysterical paroxysm. This was no proof that the coarse deception, whence originated modern spiritualism, was an offspring of hysteria.[1] And the same may be said in regard to persons who exhibit snakes, maggots, or other worms, toads, bugs, etc., which they profess to have expelled from the mouth, rectum, or vagina; who drink urine or blood in order to vomit it, and who undertake numberless other ingeniously contrived methods of imposture. Hysteria has much undeserved obloquy to bear without adding the burden of what is more justly attributable to human depravity.

Treatment of Hysteria.

The hysterical condition is vastly more frequent in women than in men, although not confined to the former. The preventive treatment should be embraced in the education and bringing up especially of girls, for the condition is apt to become developed at or even before the age of puberty. The objects in the preventive treatment are to repress a disproportionate evolution of the emotional sentiments, to bring them into proper subordination to the intellectual faculties, and to strengthen self-control. In the education of children who manifest undue susceptibility to emotional excitation, the mind should be directed to intellectual pursuits by studies in physics, mathematics, philosophy, natural history, etc. Even religious training should be conducted with a certain degree of reserve. Especially at the age of puberty, the girl or boy should, as far as possible, be withdrawn from everything tending to sexual development or excitation. This object is best accomplished by proper associations, judiciously regulated physical exercise, and studies or occupations which involve intellectual interest and activity.

The treatment of the hysterical condition embraces palliative remedies, the removal of associated disorders, measures to invigorate mind and body, and moral management.

The value of assafœtida and valerian as anti-hysteric remedies is established by long usage. It is a general impression that the former is useful in a great measure or chiefly from a moral effect. This impression is not without some foundation in fact, but the remedy undoubtedly has a decided medicinal effect. The bromides may often be prescribed with advantage. They should be taken occasionally, or continued for a short time only, in order to avoid the formation of a habit from which it may not be easy to break away. This precaution applies much more strongly to opium, alcoholics, and the hydrate of chloral, each of which may be prescribed advantageously in some cases. Hysterical patients are apt to drift into the habitual use of these articles, the evil consequences of which need not be here recited.

The removal of associated disorders of any kind is an important part of the treatment. Whatever impairs the general health is apt to conduce to the hysterical condition. This is true especially of affections of the sexual organs, and of anæmia induced by any cause. The indications coming under this head will, of course, vary in different cases according to the nature and seat of the associated disorders. A very large proportion of hysterical patients are anæmic, and anæmia promotes hysteria, as it does other of the neuroses. The restoration of the normal state of the blood is, therefore, in most cases, an object of treatment.

---

[1] *Vide* "Discovery of the Source of the Rochester Knockings," by the author, in the Buffalo Medical Journal, vol. vi. 1851.

The invigoration of mind and body is to be effected by a substantial diet, by a fair proportion of time given to life in the open air, by the daily use of the sponge-bath with sea-bathing in summer if practicable, and by healthful mental recreation. Without going into further details, measures having reference to these several means of promoting mental and bodily vigor are to be directed according to the requirements and circumstances in different cases. Here is ample scope for the useful exercise of judgment on the part of the practitioner. As a means of general invigoration, electricity is useful. Drs. Beard and Rockwell state, as the results of their experience, that general faradization and central galvanization are the methods of electrization indicated, and that the success of electrical treatment is sometimes most remarkable.

The moral management often calls for much delicacy and tact. It is an error to treat hysterical ailments as of no consequence, and, still more, to make them topics for ridicule. The fact is not to be overlooked that they denote a real affection, albeit not of a grave character. On the other hand, the conduct of the physician may be such as to foster morbid ideas and apprehensions. Well-timed assurances and explanations will often do much toward the removal of these, the confidence of the patient being secured by proper manifestations of consideration and interest. Encouragement and incitements to strive to maintain self-control may lead to success. The name hysteria is sometimes used with advantage if care be taken to avoid any imputation carrying with it reproach or contempt. While the reality of the malady is acknowledged, patients may be led to believe that it is to be overcome by increased power of the will. Change of scene and new associations are sometimes to be advised. It is desirable that the latter involve a certain degree of moral restraint. This conduces not a little to self-control. A patient giving way easily to hysterical emotions or impulses at home, or when surrounded with intimate friends, may exercise effectual resistance among strangers toward whom there is a feeling of reserve or awe.

The hysterical condition is met with in all classes of society, but especially among the luxuriously indolent, the devotees of fashion, and those addicted to social dissipations. It is a part of the moral management to take cognizance of these etiological influences, and to point out, in a proper way, the injurious effects of late hours, the excitements of what is known as a fast life, and an unhealthful, if not immoral, literature. On the other hand, undue excitation of the highest and purest sentiments is also, in a sanitary point of view, injurious. How much causative agency, in certain cases, is attributable to ungratified sexual desire, and to its unnatural gratification, it is not easy to ascertain; but undoubtedly these causes have been overrated. The propriety of advocating matrimony as a remedy for hysteria is, to say the least, doubtful. Events incident to married life, namely, miscarriages, pregnancy, lactation, etc., are not infrequently causative agencies; and cases of hysteria, perhaps, are not less frequent after than before marriage. It is questionable, indeed, whether over-indulgence in sexual pleasures, oftener than continence, be not causative of hysteria. The affection, as is well known, is common among prostitutes.

ALCOHOLISM. DELIRIUM EBRIOSUM. DELIRIUM TREMENS. DIPSOMANIA.

Alcohol, in addition to its effects as a factor in the causation of certain diseases, namely, cirrhosis of the liver, gastritis, pachymeningitis, fatty degeneration of the heart, and exclusive of its general effects upon body and mind, gives rise to definite affections embraced under the name alcoholism. One of these is the toxical delirium followed by coma, so familiar to the observations of every one as drunkenness. It is often important to recognize alcoholic coma. Without proper attention, it may be mistaken for other and graver affections, and *vice versa.* It has been considered already in the group of affections giving rise to coma (*vide* page 514).

DELIRIUM EBRIOSUM.

A rare affection which, like that just referred to, is a direct toxical effect of alcohol, has for its most prominent and characteristic feature, in some cases, active delirium. The patient is violent, and may require strong efforts for restraint. The condition is that of acute mania. The delirium, in other cases, is less intense, and it is sometimes hilarious. This affection lacks the characteristics of delirium tremens. The face is flushed, the eyes injected, the head hot, and there is throbbing of the carotids; in short, the delirium is accompanied by the symptoms of active cerebral hyperæmia. This condition, in fact, exists, and is caused by alcoholic excitation. The delirium is due to the hyperæmia and the presence of alcohol in the blood. The affection may be distinguished from delirium tremens by the name delirium ebriosum. It is developed after a prolonged and excessive debauch.

Prompt relief is obtained by venesection, which may be employed, provided there are no circumstances, exclusive of the cerebral affection, contraindicating it, and there are not likely to be any. Cold applied to the head by means of the douche or ice-cap, and an active cathartic, will suffice if the affection be comparatively mild.

DELIRIUM TREMENS.

Delirium tremens is the alcoholic affection which most frequently comes under the cognizance of the physician. Persons in alcoholic coma, or intoxicated, are generally allowed to recover without medical treatment. Delirium tremens is easily recognized by diagnostic characters relating to the mental aberration. The prodromic period, which usually lasts two or three days, offers symptoms which plainly foreshadow the affection, especially if the patient be known to be an habitual drinker. During this period, the patient suffers from intense mental depression, significantly termed "the horrors," which sometimes impels to suicide.

There is tremor, generally, of the hands, but especially of the tongue. Anorexia and sleeplessness are constant symptoms. The recognition of the import of these premonitions should lead to timely treatment which may prevent the development of the affection. Their significance is enhanced by the circumstances under which they occur. As a rule, delirium tremens follows the interruption of the habits of the patient in regard to the use of alcoholics. This may be owing to various circumstances, such as the inability to obtain liquor, intolerance of it from gastritis, or functional disorder of the stomach, voluntary suspension of its use, the occurrence of surgical accidents, and pneumonia, or some other disease. These circumstances are to be taken into account, in connection with the symptoms of impending delirium tremens.

The peculiarities of the delirium are distinctive of the affection. They consist of hallucinations of vision, and not infrequently, also, of hearing. In some cases, for a time, these are not disagreeable. The sights and sounds may be of an amusing, a ludicrous, or even of an exalted character. Generally, however, from the outset, and after a time always, they are very far from agreeable. The patient sees reptiles and other animals which are disgusting or ferocious. He hears sounds of men or beasts seeking to do harm. These hallucinations do not at once become delusions. The patient appreciates that they are phantoms of the imagination. But they soon have the force of realities, and the patient suffers precisely as if everything seen, heard, or imagined, were real. It is difficult to form a just conception of the mental agony from the horrible delusions which often characterize the delirium. As if this world could not furnish those sufficiently terrific, they are sometimes borrowed from the infernal regions. It is not very uncommon for patients to believe that they are pursued by demons from hell. The reality of the delusions is shown by patients leaping out of windows; or, if eluding the vigilance of attendants they get out of doors, by running long distances in order to escape fancied danger. A patient under the author's observation, overcoming the resistance of the nurse, fled from the hospital, and his fate was never ascertained. This fearful picture of the affection is not applicable to all cases. The hallucinations and delusions sometimes are simply of a repulsive character, and excite annoyance without the mortal terror which is often manifested. Generally, patients do not offer violence to those around them; but this is not an invariable rule. They sometimes attack the physician or others, under the idea that they themselves are in danger of being attacked. In general, the delusions are transitory, but in some cases the mind adheres for some time to the same delusion. The author once visited a patient who had not taken to the bed. He conceived the idea that the visit had some aggressive object, and he immediately went for a loaded gun which he had in the house. The professional visit terminated before he returned with his weapon. He came immediately to the author's house, gun in hand, and demanded to see him. Fortunately, perhaps, a friend who knew the patient well, met him at the door, and persuaded him to go home. It is rarely the case that physicians are not able to manage patients with this disease, without resorting to forcible restraint.

The characters of the delirium, together with sleeplessness, the absence of local symptoms denoting cerebral meningitis, fever also being absent, render it easy to exclude other affections and establish the diagnosis, even without knowledge of the habits of the patient. Information respecting the latter is not always readily obtained. Delirium tremens is sometimes developed in persons who have never given any manifestations of being under the influence of alcohol; and the habit of drinking may be practised so secretly that it is effectually concealed from the most intimate friends.

Delirium tremens, in the great majority of cases, ends in recovery, if not developed as a complication of a surgical accident, or some important disease such as pneumonia. After a period varying from two to six days, as a rule, sleep is obtained. Having slept for many consecutive hours, the patient awakens generally free from delirium. If the first sleep be of short duration, the delusions are usually lessened, and the patient soon sleeps again. Natural sleep is the evidence that the affection is about to end favorably, and also the means of a favorable ending. The recovery is, in most cases, rapid. Relapses generally occur for the reason that patients rarely, even after repeated attacks, relinquish the habits which induce the disease. In rare instances the sleeplessness and delirium continue, and death takes place from exhaustion. In the so-called febrile form, lately described by Magnan, the temperature rising to 106° and 107°, the affection is probably complicated with meningitis, or an essential fever.[1]

Treatment of Delirium Tremens.

The development of delirium tremens, if the premonitions be recognized, may, probably, often be prevented by either a full opiate, one of the bromides, or the hydrate of chloral. These remedies act by overcoming the sleeplessness which is undoubtedly an essential factor in developing the disease. The importance of watching for the premonitions, especially in surgical and medical cases, is evident.

That different methods have been followed by success in treating this disease, is easily accounted for by the fact that, under any method not positively injurious, the termination would, in the majority of cases in which no other disease is associated, be favorable. This is not saying that treatment is not advisable. There is reason to believe that each of the different methods is useful in a certain proportion of cases. In mild cases the disease may be allowed to pursue its course without medicinal interference. In these cases, soothing the patient, giving nutritious food as freely as practicable, and endeavoring in various ways to induce sleep, will suffice for the treatment; but, even in these cases, it is probable that the judicious use of remedies will often shorten the duration of the disease.

The important remedies are opium, alcohol in some form, chloroform by inhalation, and the hydrate of chloral, the bromides, digitalis, and antimony. Opium given in large and enormous doses, as was formerly the practice, was conclusively shown by Ware to be pernicious. Sleep is the desired object, but narcosis is not a substitute therefor. It is hazardous to induce the latter. But an opiate in small or moderate doses is often useful. This remedy should be tried. A quarter of a grain of the sulphate of morphia every four or six hours, or an equivalent of codeia or some other preparation, is the safe limitation as regards dose and intervals. Alcohol is relied upon by many, but opposed by some on the ground of moral considerations. The latter are of little weight. The patient will not be likely to resume the habit which has caused the disease any the more because alcohol may have conduced to recovery. In the treatment, alcohol should be given in moderate quantity, and suspended when sleep occurs. It is indicated especially when the patient is much enfeebled, and the pulse denotes cardiac weakness. The inhalation of chloroform may be tried, especially when the delusions induce extreme terror, or violence of delirium. It sometimes is useful, but more frequently it fails. The attempt to produce anæsthesia is often resisted by the patient, and the violence of the delirium is thereby increased. The hydrate of chloral is more easily employed. It sometimes acts like a charm. Proper precautions are to be observed in the use of this remedy. The bromides may be given with much less reserve. They should be fairly tried. Their effect is sometimes excellent, and sometimes *nil*. Digitalis is in some cases notably efficacious. It is indicated especially when the heart's action is frequent and weak. It is unnecessary to give this remedy in doses of from half an ounce to an ounce of the tincture, as may be done with safety; half an ounce of the infusion every two or three hours will secure all the benefit to be obtained from it. Antimony is suited to a certain class of cases, namely, those in which the symptoms are violent, the patient robust, and the action of the heart strong. As a sedative remedy, it is notably effective in some of these cases. It should be carried to the extent of producing nausea. It may be advantageously combined with an opiate.

---

[1] *Vide* Ziemssen's Cyc., Am. ed., vol. xvii. p. 404.

Good nursing has much to do with the speedy success of treatment. Attendants who have tact in calming the patient, a quiet room, avoidance of all excitement, sponging the face, head, and body, the warm bath, the wet pack, or, sometimes, if the patient consent, even the shower bath, contribute to the object of treatment, namely, sleep. Alimentation is highly important. As much nutritious food should be given as can be taken and digested.

In convalescence the use of alcohol in any form should be emphatically interdicted, and the etiology of the malady should be made clear to the patient. This is plainly the duty of the physician, notwithstanding often it is a delicate undertaking, and one which may diminish the patient's regard. While the responsibility of making the patient understand that his malady was the effect of alcohol cannot be avoided, it is not less a duty of the physician to consider this a professional secret as regards others. Tonic remedies, a nutritious diet, and hygienic measures to invigorate body and mind, will not only expedite recovery, but render much aid in preventing a return to the alcoholic habit.

DIPSOMANIA.

Using the term drink, as it is commonly used, to denote alcoholic beverages, a craving therefor, uncontrollable, or with difficulty controlled by the will, is expressed by the name dipsomania. A strong desire for alcoholic beverages is innate in certain constitutions. Some persons, conscious of this propensity, are able, by their strength of will, to resist it. Others, with either a stronger constitutional craving, or a weaker power of self-control, fail to oppose an effectual resistance, and become drunkards. The propensity is sometimes under control so long as any indulgence is refrained from, but directly an alcoholic drink is taken in any quantity, the power of self-control is lost, and indulgence is carried to the extent of producing drunkenness. The dipsomania in some persons is periodical. After intervals of varying duration they commence to drink, and keep themselves in a state of drunkenness until the stomach refuses to tolerate further indulgence. Vomiting occurs, with mental and physical prostration; epileptiform convulsions sometimes take place, and, not infrequently, the period is concluded with an attack of delirium tremens. Persons of intelligence, education, strong mental powers, and excellent moral qualities may be subject to these periods of drunkenness, and in the intervals discharging the duties of life with propriety and ability. These facts show that they are afflicted with a constitutional malady.

In most cases of dipsomania the craving for drink is acquired. Indulgence leads to the formation of the alcohol habit. Habitual indulgence increases the craving, and impairs more and more self-control. The result is frequently, but not always, inebriety. There are those who drink daily and largely, but who are never drunk, and not incapacitated for mental and physical work. They may die of cirrhosis of the liver, or of diseases into the etiology of which alcoholism enters; and the effects of alcohol diminish the power of resistance to affections produced by other causes. Various circumstances lead to alcoholic craving, and its indulgence. Prominent among these are convivial and vicious associations, pain or uneasiness of some kind, which is relieved by alcohol, a sense of exhaustion from over-work, depression, and a desire to drown sorrow. When the habit of drinking becomes confirmed, like the opium habit, it holds its victims in iron fetters. The proportion of instances in which the habit is permanently overcome is small; but there are a few instances, and this is a fact not to be overlooked.

The diagnosis in cases of periodical or habitual drunkenness is easy enough. Habitual drinking to more or less excess, without inebriety, however, may not be readily ascertained. Patients who consult physicians for ailments giving rise to a suspicion of the alcohol habit, or, with reference to the treatment of which it is important to know whether this habit exists, often will confess only to a moderate degree of indulgence. Their families and intimate friends not infrequently are not aware of the habit. Moreover, physicians are apt to feel, in certain cases, reluctance to press inquiries very closely. The breath of the patient, in many cases, reveals the fact. There are two kinds of odoriferous breath which are pathognomonic. One kind is a mawkishly fragrant breath, suggestive of the odor of chloroform. The other kind it is not so easy to characterize by words. It is a peculiarly repulsive fetor which, after its significance is known, is recognized without difficulty. The evidence thus obtained is sometimes to determine the judgment in opposition to the statements of the patient and others. Corroborative evidence may be afforded by ailments and symptoms, namely, hydroperitoneum, gastric or intestinal hemorrhage, enlargement of the superficial abdominal veins, anorexia vomiting and the diagnostic characters of chronic gastritis, tremor of the hands or tongue, etc.

Treatment of Dipsomania.

Dipsomania is a disease; the craving for alcohol, whether constitutional or acquired, is morbid. If these assertions be true, intemperance is not to be regarded as a vice. Vicious associations, doubtless, often are instrumental in the formation of the alcohol habit. That intemperance leads to criminal acts is undoubtedly true. A person already committed to vices or crimes, has not the protective influence of self-respect and the respect of others against the formation of the habit, and he is, therefore, especially liable to become intemperate. Such a person, moreover, may resort to drink to drown a sense of remorse. Men and women, however, do not become drunkards from deliberate choice. It is not from moral perverseness that they continue to be so, or to drink immoderately without inebriety. An intemperate person, if not an imbecile, is not ignorant of the calamitous consequences of intemperance. A decently intelligent drunkard is not self-deceived in this regard. None can better appreciate the arguments against the inconveniences and sufferings incident to the alcohol habit, than one who experiences them. To convince a drunkard that drunkenness is a heinous sin or a crime, is not to effect a cure, but, on the other hand, sometimes, by inducing discouragement or despair, it may have an opposite effect. The recognition of dipsomania as a disease conduces, not only to a proper degree of charitable consideration, but to appropriate measures of treatment. These views are not to be construed into an apology for intemperance, but they constitute a plea for compassion and assistance in behalf of a class of unfortunates, than whom none are more in need of sympathy and curative aid. Nor does this attitude towards drunkards betoken any lack of appreciation of the evils of drunkenness, arising from the disruption of family ties, neglect of social duties, incapacity for usefulness, and criminal acts, to all of which it so largely contributes. On the contrary, these evils will be diminished in proportion as dipsomania, regarded as a pathological condition, be successfully treated.

The first step toward treatment is to secure the consent and co-operation of the patient. For this, it is to be understood by the patient, as well as the physician, that a morbid condition, and not a state of moral turpitude, is to be treated. The total abandonment of alcohol in any shape is a *sine qua non* in the treatment. A solemn pledge to that effect, added to the sanitary considerations relating to mind and body, is most desirable. Granted that pledges are often broken, they not infrequently afford effectual aid in the effort to maintain self-control. The author could cite an instance within his knowledge in which nearly forty years ago a pledge of total abstinence was taken by one who did not shrink from doing so openly, as a "reformed inebriate." That pledge has been kept, and the person referred to has since filled with honor positions involving great distinction and responsibilities of the highest order. Who can doubt the immense benefit of the labors, many years since, in this country, of Father Mathew, in administering pledges invested with the force of religious faith!

The immediate objects of treatment are, diminution of the morbid craving, and increase of the power of the will. Other things being equal, the intensity of the craving is in proportion to the duration of indulgence; and the decrease is proportionate to the period of abstinence. Time is, therefore, an important factor as regards the first of the two objects, and, also, of the second, for the strength of the will increases the longer it is successfully exercised. Meanwhile, the craving sensation may be in a measure relieved by stomachic tonics and stimulants into which alcohol does not enter. Success in respect of both objects is promoted by improvement of appetite, digestion, and assimilation. The craving is lessened if the body be well nourished, and the power of the will is not a little dependent on good blood, together with the healthful play of all the vital functions. An invigorating hygiene, together with mental occupation or diversion, forms an important part of the curative treatment. The moral effect of assurances that the craving will in time cease, and self-control become less difficult, is often of essential importance. Following these general principles, the patient and physician acting in mutual confidence, dipsomania is curable in a certain proportion of cases.

The treatment just sketched presupposes not only a willingness but a certain amount of ability on the part of the patient to co-operate with the physician. The latter may be wanting. The power of the will is too much impaired. A resolution to abstain may be formed, but the mind is so weakened by alcoholism and the habit of yielding, that it is powerless in the attempt to resist the alcoholic craving. Under these circumstances the only hope is in an institution in which cases of dipsomania are treated. Inebriate asylums, either public or private, based on the principle that drunkenness denotes disease, are required for these cases. If these institutions have not accomplished as much as expected or hoped for, the explanation is to be sought after, not in the principle, but in defects of management. These are to be corrected by experience. Recourse to such an institution, to be successful, should, if possible, be voluntary on the part of the patient. A legal commitment, in opposition to the wishes of the patient, carries with it the stigma of crime. It conflicts with an important point in the treatment, namely, the co-operation of the patient. It is far less likely to be successful than when the patient consents. It may be proper to enforce total abstinence as a measure of protection against self-injury or the injury of others. These are considerations belonging to the legal, not the therapeutical, aspect of dipsomania. We have to deal here with the latter only. The author's opportunities for personal observation of the value of inebriate institutions have not been large, but he could cite several instances within his knowledge in which, having been resorted to with the patient's consent, they have effected a permanent cure.

The truth which underlies the treatment of dipsomania is, it is to be treated not as a vice, but as a disease. Drunkards may not infrequently be cured, but they are very rarely reformed. As regards the curative effect of punishment, legal penalties might as well be instituted to cure epilepsy. Waving the significant and important question, Is punishment ever reformatory? we have to deal, in cases of dipsomania, with veritable disease, claiming as such medicinal remedies, but more especially moral management, together with measures relating to mental and physical hygiene.

The prevention of intemperance is legitimately a subject for medical investigation, inasmuch as it involves the prophylaxis of alcoholism. To consider this subject, however, it would be necessary to inquire into the diverse causes which lead to the alcohol habit, and to discuss mooted questions relating to preventive measures; it cannot, therefore, be embraced within the scope of this work. One general statement must suffice, namely, the prevalence of intemperance will diminish in proportion as healthful hygienic influences, physical and mental, pervade all classes of society; and, among the requirements of these, is the allotment of a proper share of life to innocent enjoyments and healthful recreations.

The medico-legal relations of alcoholism hardly fall within the range of clinical medicine, but they claim the attention of physicians. While they who make and administer laws are actuated chiefly by the duty of protecting life and property in communities, it is a duty of medical men to endeavor to protect from injustice those suffering from disease. It is certain that offences committed in a state of alcoholic mania are without deliberation, and are insane acts. If it be held that these offences admit of no extenuation because the insanity is voluntarily induced, the latter statement is by no means always correct; and, moreover, the principle may be applied to other forms of mania and delirium. If dipsomania be a disease, without going into its etiology, to hold a dipsomaniac responsible for his acts is, from a medical standpoint, barbarism. If the principle be assumed that injustice to a few, in consideration of the welfare of many, be justifiable, consistency demands that this principle, as applied to dipsomania, be extended to other varieties of insanity.

The immediate effects of alcohol, and its remote effects upon the mind, in cases of chronic alcoholism, as affecting competency in disposing of property by will or otherwise, in making contracts, etc., give rise to medico-legal questions which call for knowledge and the exercise of judgment on the part of the physician.

VERTIGO.

Vertigo, giddiness, swimming of the head, are terms expressing a sensation with which every one is familiar. The sensation is as if either the person or surrounding objects were rotating or turning round. The sensation is produced by voluntary rotatory movements continued for some time, as in waltzing, by the movements in swinging, and by the motions of a ship, if one be unaccustomed to sailing. It is a symptom in alcoholic intoxication, and is occasionally incident to various diseases.

Vertigo is to be regarded as a functional affection when it occurs in paroxysms, the vertigenous sensation being more or less marked, and frequently associated with other disturbances especially of the stomach. The sensation may be slight, not affecting the voluntary movements of the body, or, in a greater degree, the person walks with a reeling, staggering gait. In a still greater degree, the patient stands with difficulty, and, if not supported, may fall to the ground, very rarely, however, losing consciousness. A paroxysm may be of momentary duration, or it may last for hours and days. The vertigo may disappear if the patient keep a recumbent posture, and return whenever the head is raised. Paroxysms are sometimes brought on by an intellectual effort. A late distinguished professor of anatomy informed the author that he had often lectured when liable to vertigo if he raised his head sufficiently to see those seated in the upper benches of the amphitheatre. Paroxysms are often accompanied by nausea and vomiting. There is apt to be a feeling as if something serious were about to take place, and patients naturally think of an attack of apoplexy, paralysis, or convulsions. This state of mental apprehension induces a sense of great prostration. In the intervals, patients are often extremely anxious. They are afraid to be left alone, or to go out unattended, and they avoid, as much as possible, assemblages or public places. In not a few instances which have come under the author's observation, this affection has occasioned a state of great mental depression for years.

In not one of many cases which the author has observed, were the paroxysms premonitory of either of the affections just named, nor followed by any grave sequel. On the other hand, apoplexy, paralysis, and convulsions are very rarely, if ever, preceded by paroxysmal vertigo. The physician is, therefore, justified in giving the strongest assurances that the affection is unattended by danger either proximate or remote. These assurances may do not a little toward lessening the severity of the paroxysms, inasmuch as an important element often is mental agitation. An opposite course, that is, intimating to the patient that the vertigo indicates a liability to some serious cerebral trouble, is productive of much needless uneasiness. An intimation of this sort is sometimes given by physicians, and hence it is desirable that the foregoing view of the prognosis, as regards danger, be generally accepted, assuming its correctness.

Knowledge of the pathology is desirable as leading to rational indications for treatment. The affection has heretofore been generally attributed to gastric disorder, and it has been called stomatic vertigo. The frequent association of nausea and vomiting is suggestive of this connection; but gastric symptoms are not always associated, and, when present, they are probably oftener effects than causes. A pathological explanation, which, within a late period, has been offered, seems applicable, at least, to a certain proportion of cases. This attributes the vertigo and associated symptoms to an affection of the semicircular canals of the internal ear. From this supposed connection, the affection has been called aural vertigo, and Ménière's disease from the name of the author who was among the first to offer this explanation. The explanation is rational in view of the physiological relations of the semicircular canals to the faculty of preserving an equilibrium in standing or in movements of the body. It is also supported by clinical facts. Tinnitus aurium accompanies the vertigo not infrequently. The buzzing may be confined to one ear, or referred to both ears. Deafness exists in a certain proportion of cases, which may be either unilateral or bilateral. Again, paroxysms of vertigo accompanied by deafness have ceased on removing from the meatus a foreign body and accumulations of wax. In some cases of vertigo, with vomiting, etc., an attack is coincident with sudden deafness. Knapp has reported such a case.[1] These symptoms have been produced by an injury of the head, deafness remaining after the other symptoms have disappeared. Finally, in one of Ménière's cases, the patient died on the fifth day after a sudden attack of deafness accompanied and followed by persistent vertigo and vomiting, the autopsy showing no disease of the cerebrum, cerebellum, or spinal cord, but a bloody exudation within the semicircular canals.

Will this explanation apply to all cases? Probably not. When dependent on an affection of the labyrinth, the vertigo is attributable to a reflex influence through a nervous connection with the cerebellum. The condition thus induced may occur irrespective of this connection in the cases in which there are no local symptoms pointing to an affection of the internal ear; but, on the other hand, it may be conjectured that functional disturbance within the semicircular canals, giving rise to vertigo, may exist without appreciable local symptoms.

Treatment of Vertigo.

The affection seems in some cases fairly attributable to prolonged over-exertion of the mental faculties. At all events, it disappears when intellectual labors are intermitted. The use of tobacco, strong coffee or tea in excess, and immoderate indulgence in alcoholic beverages are to be interdicted. Quinia in full doses is said to be useful. This remedy in moderate doses and other tonic remedies have seemed to the author to be of much use. Counter-irritation, even with the actual cautery, over the mastoid process, is advised; of this the author cannot speak from any personal observation. An important injunction in regard to the treatment is not to resort to depletion, cathartics, and low diet, under the impression that, by these means, impending cerebral trouble is to be averted. The patient should be well nourished, and mental diversion is desirable. The cases should be carefully examined, and any discoverable local affection should receive appropriate treatment. M. Charcot has reported two cases of Ménière's disease in which entire relief was obtained by the persistent administration of the sulphate of quinia, continued in one case for three and in the other for two months.[2]

---

[1] For clinical facts relating to this affection, including a synopsis of the cases reported by Ménière, the reader is referred to "A Clinical Analysis of the Inflammatory Affections of the Inner Ear," by H. Knapp, in Archives of Ophthalmology and Otology, vol. ii., No. 1, 1871. Reprinted by William Wood & Co., New York.

[2] *Vide* Amer. Journ. of Med. Sciences, April, 1876.

MELANCHOLY AND HYPOCHONDRISM.

Melancholy (Melancholia, Lypemania) is to be regarded as a neuropathic affection when not attributable to an adequate mental cause, such as the death of relatives or friends, loss of property, position, or character, etc., and when not a symptom of gastralgia, dyspepsia, alcoholism, or other recognizable diseases. Cases of this affection not infrequently come under medical observation; but, in many instances, physicians are not consulted, a common belief, with reference to a "mind diseased," being that the apothecary, in Shakspeare's tragedy of Macbeth, uttered a truth in saying "therein the patient must minister to himself." Doubtless much mental distress would be relieved, and insanity sometimes prevented, were melancholic patients more in the habit of considering their malady one properly coming under the cognizance of a medical adviser. The diagnosis requires only the exclusion of other affections of which melancholy is a symptom, and of adequate mental causes.

The measures of treatment indicated are chiefly mental, and vary according to the varying circumstances in different cases. Not a few persons are constitutionally prone to melancholy, and this tendency is sometimes inherited. It may be manifested in early childhood. Aid in resisting and in bearing the malady is afforded by the knowledge of the fact that it is due to a peculiarity of mental organization. An acquired melancholic tendency or habit is produced in different ways. Some of the causes may be enumerated as follows:—

Over-sensitiveness of mind or a morbid tenderness of conscience may lead to such an exaggeration of events and voluntary acts as to occasion deep melancholy. Inability to repress thoughts and feelings deemed unworthy and gross may be a cause. The grief and remorse following criminal or sinful offences do not constitute the affection, as these are attributable to adequate causes. The counsels of judicious spiritual advisers are adapted to the class of melancholic patients just referred to.

The want of satisfying aims and occupations is a frequent cause of melancholy. Bachelors and old maids, persons of fortune with no pursuit in life, and the votaries of pleasure, form a class furnishing many cases which are etiologically associated. Relief or cure in these cases is effected only by adopting some course which will bring into proper exercise the intellectual and moral faculties. A wealthy bachelor who for several years was in the habit of consulting the author in paroxysms of the deepest melancholy—who had tried in vain many remedies; who had exchanged a city for a rural life, purchasing a large and well-stocked farm, which he soon relinquished in disgust; who had gone into business and lost money, as he said, in accordance with medical advice, without, as he naively added, deriving therefrom any benefit—at length resorted to matrimony. With a wife and two children to engage his thoughts and sentiments, he has now had no return of his malady for many years.

Relinquishment of habits of mental activity not infrequently leads to melancholy. Examples are of men who retire from professional life or active business pursuits to enjoy ease, or to carry out a poetical idea of rural felicity. The violation, in these instances, of the immutable law of our being, which makes labor and the exactions of habit conditions of happiness, induces melancholy, sometimes ending in insanity.

The confinement of mental activity within narrow limits, without diversion or recreation, is a cause of melancholy. The object which engrosses the mind may be money-getting or a particular study. A young man who had devoted all his energies for several years to financial operations attended with much excitement, and who had acquired a large fortune, was unable to take interest in anything except making money. With everything pertaining to domestic life, social relations, and an honorable position to render him apparently one of the most enviable of men, he declared that he believed there was no one more wretched. With much difficulty he was induced to travel a year in Europe. He returned a new man, and, with less indulgence of his former passion, has for several years been free from the malady connected with it.

Melancholy from these causes is prevented or relieved in proportion as they can be contravened or removed. It is evident that each case must be a separate study with reference to the causative circumstances, and the measures to be advised in the way of treatment. It is also evident that the circumstances are often such as to be entirely without the reach of medical control. The affection prevails chiefly among the more intelligent and well-to-do classes. They whose necessities demand constant occupation, and who are satisfied with the ordinances of Providence which have determined their position in life, are not often melancholic. Men are more subject to melancholy than women. In women, however, it is not uncommon at the time of the cessation of the menstrual function. The author has been led to attribute the causation more to a moral than a physical influence. This event in the life of women has a twofold significance. It is evidence of advancing years, and it denotes incapacity for bearing children. Both are often not without considerable moral influence. Even if a woman be unmarried, and has no expectation of marriage, or, if married, there be no desire for children, the loss of the capability of impregnation, in its effect upon the mind, is not unlike the idea of impotency in men who do not expect ever to exercise the sexual function.

The treatment of melancholy is chiefly, but not altogether, mental. There is no special medication; but any functional disturbances which may be discovered, are to be treated by appropriate remedies. Alcoholics and opiates are never to be advised as palliatives. Patients are apt to seek relief from these sources, and it is the duty of the physician to give proper warning of the dangers in so doing.

Hygienic measures are often of much benefit. Abundant exercise in the open air, with agreeable mental occupation, as in hunting, fishing, boating, etc., and travelling, are not infrequently curative. Invigoration of the body, as well as the mind, is a means of enabling the patient to overcome the malady.

Hypochondrism (hypochondriasis) is generally associated with melancholy, although the latter by no means implies the former. Patients with different diseases, and persons in health, often manifest a hypochondriacal mental condition greater or less in degree, without being sufficient to constitute a neuropathic malady. The mind of a typical hypochondriac is occupied in a rigid surveillance of the bodily functions, and in constantly seeking therein for symptoms of disease. In extremely marked cases, patients are wholly absorbed in this species of self-examination. They exemplify an absurd exaggeration of the maxim, "Know thyself." The range of their observations may embrace the whole organism, or the attention may be devoted to particular parts. A favorite field of observation is alimentation; the effects of different articles of food are carefully studied. As a matter of course, there are disorders of digestion, real or imaginary, and patients are often led to adopt a starvation diet. The fecal evacuations offer another fruitful field which some hypochondriacs cultivate assiduously. The attention in some cases is directed to the urine, especially within late years, owing to the popular knowledge of the frequency of renal disease. A patient who came under the author's observation had carried his examination so far as to study works on urinary diseases, and, becoming an expert in microscopy, to analyze daily his urine, chemically and microscopically, for a series of months, there being no appearances at any time pointing to disease of the kidneys. The sexual system by no means escapes this autoscopia. Hypochondrism frequently takes this direction. The hypochondriacs who are deluded on the subject of spermatorrhœa, form a distinctive class of patients, and, from their peculiarly furtive, sheepish manner, they may often be recognized before they have stated their supposed malady. They generally believe that they are suffering from the effects of youthful ignorance and indiscretions, having been alarmed by works written for that purpose. They have often spent much money in nostrums and treatment by the host of quacks who thrive upon their credulity. If candidly assured by a physician that their apprehensions, as regards the permanent consequences of the past, are greatly exaggerated, and that their malady is mental, they are incredulous, and seek medical advice elsewhere; hence they often go the rounds, consulting all the practitioners within their reach. They are a pitiable but hopeless class of patients. As an illustration of the minuteness of investigation, while engaged in writing on this topic the author has been consulted by a patient, who, requesting that he should not be asked to give his name, was anxious, among other things, concerning the consistency of the spermatic secretion, his anxiety being based on his examinations after involuntary emissions.

Syphiliphobia is one of the varieties of hypochondrism. Hypochondriacs who have had, or who suppose that they have had, syphilis, torture themselves with the idea that they discover its manifestations, or with apprehensions of their occurrence.

Softening of the brain and threatened lunacy are maladies on which the minds of some hyponchrondriacs become fixed. Introspection directed toward the mental faculties has a wide range, and it is easy for patients to discover sensations or feelings in support of imaginary fears in that direction.

In all the varied aspects under which hypochondrism is presented, the diagnosis involves exclusion of the diseases which are imagined, and of their premonitions. The deportment of patients, and the way in which cases are stated, often afford presumptive evidence of the mental affection. The subjective symptoms, as described, are indefinite and incongruous. They are apt to be numerous. A hypochondriac has generally a long story to tell of manifold ailments. A patient who brings a description of symptoms written with much detail, lest there might be some omissions in a verbal account, may at once be suspected of hypochondrism; but here, as in all instances, a diagnosis should not be formed without a full investigation.

The treatment is mainly moral. The objects are to convince the patient that the imaginary maladies neither exist nor are likely to occur, and to break up the habit of introspection, and seeking for the evidences of disease. These objects are not accomplished by ridicule nor by reasoning, but by authoritative opinions and injunctions. The confidence of the patient must be fully secured. For this end a proper degree of interest in, and investigation of, cases are requisite. The patient must believe that the physician speaks from knowledge, and that he tells the truth. Hypochondrism is encouraged by physicians who are doubtful of the diagnosis, and share in any measure the opinions or apprehensions of the patient. With confidence in the diagnosis, the positive assertions of the physician will, in a certain proportion of cases, carry conviction. Hypochondriacal patients should be enjoined not to read medical writings; not to make their ailments subjects of conversation except with their medical advisers, and not to attempt any investigations with reference to the existence of particular diseases.

Hypochondrism often involves the same causes as melancholy. In these cases the causal indications are similar, in addition to the objects just stated, and the remarks respecting the treatment of the latter are alike applicable to the former.

NERVOUS EXHAUSTION.

The terms nervous exhaustion, nervous asthenia, neurosthenia, denote functional debility, especially of the cerebral organs. It is to be regarded as a distinct affection only when not an effect of any discernible disease, either of these organs, or in other situations. As one of the neuroses, it may be defined functional debility induced by excessive or unduly prolonged activity of the brain functions, that is, the mental faculties. The etiological part of this definition excludes cerebral, and other affections of which nervous exhaustion is an effect.

The symptoms are chiefly mental, namely, lack of buoyancy or elasticity of mind, impaired power of concentrating and sustaining the attention, depression of spirits, deficient self-control as regards the emotional manifestations, a sense of lassitude, unrefreshing sleep, a jaded feeling before entering on the occupations of the day, irritability of temper, undefined apprehensions, want of usual self-confidence in business transactions, etc. Now, the presence of more or less of these symptoms, variable as regards degree, denotes the affection which may be called nervous exhaustion, provided they are not attributable to cerebral disease from their association with other symptoms, nor to anæmia, defective nutrition, or some affection which has occasioned a general debility, and provided they are not attributable to causes other than over-mental activity, such as late hours, sexual excesses, abuse of alcohol, the immoderate use of tobacco, etc. The elimination of all these is requisite for the diagnosis, and the latter is corroborated by the direct evidence of excessive or unduly prolonged activity of the brain functions. The affection occurs among those who overtask the brain by devotion to study, those who are too much absorbed in business affairs, and those whose minds are in a constant state of tension from a weighty sense of responsibilities.

The timely recognition of nervous exhaustion is undoubtedly important, in order to forestall other affections in which it may eventuate, namely, melancholia, hypochondriasis, and, perhaps, insanity. The affection, however, as here defined, is less frequent than it may appear to be. In many of the cases in which patients are considered by themselves, as by others, as breaking down from over-mental work, the exhaustion is due to some of the other causes which have been named. Mental work is often blamed when the fault lies with the non-observance of hygienic laws relating to physical exercise, out-of-door life, and invigorating recreations. With a fair observance of the laws of health in other regards, there is little risk of the activity of the mental faculties being carried too far. No organs of the body, perhaps, are better constituted to endure functional activity than those which compose the brain. These facts are not without important clinical bearings. It is not uncommon for persons to think that they are breaking down, as regards the intellect, when they are simply melancholic or hypochondriacal.

The treatment of nervous exhaustion consists in a proper degree of diminution of the voluntary exercise of the faculties of the mind. It is generally a mistake to enjoin complete cessation, for a considerable period, of mental work. The cerebral, not less than other organs, claim a certain amount of functional activity. Exercise of the mental faculties is requisite, not alone for their development, but for the maintenance of their vigor. Complete rest, which is sometimes enforced for a long period, may expose the patient to more risk than continued over-work. The treatment has a twofold object, namely, the prevention of over, and, also, of under, mental work. The latter of these objects is often as important as the former. It is a hazardous experiment for the lawyer, the clergyman, the physician, or the active man of business to exchange for the habits of mental activity incident to their several pursuits, a life in which the faculties of the mind are inactive, even if it be one of elegant leisure. It is often judicious to intermit mental work, but only for a brief period; and when resumed it should be kept, if practicable, within the limits of comfortable endurance.

Hygienic measures which invigorate the whole body are not without a salutary effect upon the brain, increasing its ability to endure functional activity. The devotion of a proper proportion of time to physical exercise, out-of-door life, and recreation, secures the advantage of intermissions of brain work. The evil consequences of resorting to alcohol in order to sustain the flagging activity of the mental powers, are sufficiently obvious.

Alcohol in some persons has this temporary effect, whereas with most persons it is otherwise. The danger of performing intellectual labor under alcoholic excitation should be pointed out. The excessive use of coffee and tea for mental stimulation should be interdicted. Measures to secure healthful sleep, if there be sleeplessness, are indicated, and form a highly important part of the treatment.

As regards remedies having a special reference to nervous exhaustion, the preparations of phosphorus are perhaps useful in promoting the nutritive processes, which are recuperative. The hypophosphite of lime, and the phosphide of zinc are eligible preparations.

SLEEPLESSNESS.

Sleeplessness (Vigilance, Insomnia), as a symptom, enters more or less into the clinical history of a large majority of diseases. It is an important factor in producing nervous exhaustion, delirium, and general prostration, in connection with different affections. Refreshing sleep is often one of the early evidences, as it is one of the means, of convalescence. It is sometimes the chief or only appreciable malady, and it is then to be treated as a distinct affection.

All persons in health, under equally favorable external circumstances, are not alike able to obtain the desirable amount of refreshing sleep. There are good sleepers and poor sleepers. The good sleeper, when the time for sleeping comes, is able to throw aside the cares and anxieties which may have arisen during the day, and to fall at once into quiet unconsciousness which continues until the cerebral organs are qualified, by reparation, for a renewal of functional activity. The poor sleeper, on the other hand, cannot shake off the affairs which have occupied the mind; perhaps ideas, excluded by the occupations of the day, occasion wakefulness and worry at night; sleep is delayed, and when it comes it is incomplete, or disturbed by dreams. The amount of rest required for the welfare of mind and body is not the same for all persons. After early life and prior to old age, this amount varies from six to eight of the twenty-four hours; cases are rare in which it is either under or over these physiological limits. It is well known that in early life more, and in old age less, is required than in the intermediate years. A good criterion, in individual instances, is the feeling with which diurnal avocations are entered upon. If sleep have been inadequate, there is a sense of lassitude which may disappear under the excitements of the day, but felt again after these have ceased. Other things being equal, the capacity for mental work and the power of endurance are in proportion as sleep is adequate to the needs of the economy.

Sleeplessness, not dependent on any other apparent morbid condition, may often be treated, with more or less success, by attention to certain points of hygiene. Mental work at night sometimes produces a kind of cerebral erethism which prevents sleep. A night-worker who is a poor sleeper, should try, if practicable, a change of the hours of mental labor to an earlier period. Mental recreation in the evening is favorable to sleep. Moderate physical fatigue has this effect, and, hence, sleeplessness is sometimes averted by muscular exercise. Passive movements and massage are useful substitutes for active exercise. A bath before going to bed, either cold or tepid, proves efficient in some instances. Exposing the body to cold air (Dr. Franklin's air-bath), for a few moments, will occasionally dispel wakefulness; and occasionally, the addition of more bed-clothes than are actually necessary, so as to cause slight perspiration, has a similar effect. Dining heartily at a late hour, in some instances, causes wakefulness, and in other instances it is caused by an insufficient meal. If a person dine at or near the middle of the day, taking a light tea or supper and going to bed late, some digestible food taken shortly before retiring may conduce to healthful sleep. The need of food not infrequently prevents sleep. Small and insufficiently ventilated sleeping apartments often account for sleeplessness or unrefreshing sleep. The prevalent fear of an abundance of fresh air is the source of much ill-health and impaired vigor. Large rooms and open windows, at all seasons of the year, are important sanitary conditions for the one-third or one-fourth of life which is, or should be, devoted to sleep. Attention to these points although it may not make poor sleepers good sleepers, will do not a little toward mitigating sleeplessness. If practicable, they who habitually fail to obtain an adequate amount of sleep at night, should try to make up the loss by a nap during the day.

Persons who suffer from inability to sleep, should not resort to the habitual use of narcotic or hypnotic remedies. Sleep, if produced by narcotics, is not normal, and the use of opiates in any form, in order either to obviate sleeplessness or to render it more tolerable, is almost sure to lead to the opium habit—a far greater calamity than that which led to it. The objections to opiates apply not less to chloroform and chloral; also, measurably, to other remedies. The desire of patients to avail themselves of them should be resisted by physicians. Most patients readily consent to forego their use if the evils and dangers be pointed out before a reliance upon them has been acquired. Of hypnotic remedies, the bromides are, probably, the least objectionable; but these should not be habitually used. A small quantity of spirit taken at bedtime, in some cases, conduces to sleep, and this may be sanctioned, if not advised, for those in middle or advanced age, who lack physical vigor.

Spinal Irritation.

This term, introduced half a century ago by Dr. Brown, of Glasgow, in the course of a few years, through the writings of Teale, Tate, the Drs. Griffin, and others, came into vogue as denoting a functional affection of the medulla spinalis, occurring especially in women, associated often with hysteria, and giving rise to neuralgic pains in different situations, muscular spasms, and various disturbances of the organs embraced in the different physiological systems. In 1844, the author contributed the results of his clinical studies relating to this affection, proposing the name spinal affection instead of spinal irritation, the latter expressing a hypothetical condition.[1] The connection of a great variety of symptoms with an affection of the spinal cord, was based on the coexistence of tenderness on pressure over one or more sections of the vertebral column, the localization of the tenderness corresponding to the relations by nervous communications with the seat of the symptoms; the exaggeration of the symptoms by forcible pressure over the column, together with the fact that notable relief was often obtained by topical applications to the tender portions of the spine. Subsequently, the term spinal irritation fell into disuse, and the phenomena which had been considered as belonging to an affection so-called, were distributed in other nosological divisions.

---

[1] Observations on the Pathological Relations of the Medulla Spinalis, Am. Journ. of Med. Sciences, April, 1844.

Late writers have revived the term, together with its former comprehensive significance, namely, as embracing certain neuralgic affections, aphonia, spasmodic cough, nausea and vomiting, hiccough, dysphagia, palpitations, dyspnœa, cutaneous hyperæsthesia, strangury and incontinence of urine, spasms of voluntary muscles, chorea, etc. The propriety of grouping all these under the name spinal irritation, is doubtful. The existence of a pathological condition of the spinal cord as an element, however, is probable, and not without practical importance. Whatever may be the theoretical view entertained respecting the nature of this pathological condition, tenderness over the spinal column furnishes an indication for treatment. Topical applications are useful. The severe methods of counter-irritation formerly in use—tartar emetic plasters, issues, setons, the moxa or eschars produced by heated iron—deserve to remain obsolete; all the benefit to be derived from topical treatment may be obtained by milder methods, to wit, sinapisms, stimulating liniments, dry cupping, and vesication. Anæmia often claims appropriate treatment in the cases in which there is spinal tenderness. Other indications relate to the seat and the character of the local disorders.

XIII.

MENTAL DISEASES OR INSANITY.

MANIA. MONOMANIA. MELANCHOLIA. EMOTIONAL AND IMPULSIVE INSANITY. DEMENTIA. IDIOCY. IMBECILITY. TREATMENT OF MENTAL DISEASES.

THIS division of the diseases of the nervous system embraces those characterized by notable disturbances of the faculties of the mind, associated, doubtless, always with abnormal conditions of the cerebral organs, but not constantly with any of the affections embraced in the preceding divisions. Certain mental affections have been already considered, as belonging among the neuroses, namely, hysteria, melancholy, and hypochondrism. These affections, as thus placed, are not characterized by disturbances sufficient in degree and duration to entitle them to a place in this division. The two latter, however, namely, melancholy and hypochondrism, existing in a greater degree and more or less persistent, are included among the diseases grouped under this heading. The diseases nosologically classed as mental, are embraced under the names, Insanity, Lunacy, Unsoundness of Mind, and Mental Alienation or Derangement. Of these different terms, the first will be here adopted. The mental diseases to be now considered are, therefore, the different forms or varieties of insanity.

As disease is a deviation from health, so insanity is a deviation from a sane condition of the mind. Now, it is impossible to define satisfactorily sanity as an abstract condition. The diversities in different persons, as regards the faculties of the mind, are very great. There is no such thing as a fixed standard. Practically, the judgment of mankind recognizes a certain range of the variations and eccentricities which enter into the character of individuals, as within the limits of sanity; insanity exists where these limits are exceeded. It would be futile to attempt to draw a dividing line between sanity and insanity. The existence of insanity in doubtful cases is to be based on the opinions of those who unite with knowledge of human nature and good sense, a practical acquaintance with the manifestations which denote that the limits of sanity are exceeded. In most cases, insanity is sufficiently evident without the testimony of medical experts; but experience and skilled investigation are requisite in order to discover evidences which, in ordinary observation, would be overlooked, and to interpret properly the significance of psychical symptoms. Physicians called upon to testify in medico-legal cases involving the question of insanity, are liable to be asked to define it. The prudent course is not to attempt a definition. There is no occasion for humiliation in the concession of inability on this score, inasmuch as no author has succeeded in framing a definition satisfactory to all minds. For an account of the numerous definitions which have been submitted, the reader is referred to works treating specially of mental diseases. Practically to decide when insanity exists, is, in most cases, not difficult. The symptoms which are diagnostic are derived chiefly from the conversation and the conduct of insane persons. The general air or manner, and the facial expressions are sometimes significant. Symptoms relating to the physical functions are also to be taken into account. Prominent among the psychical symptoms are hallucinations, illusions, delusions, and incoherence. The meaning of these several terms should be clearly apprehended. An hallucination is a false perception, not based on any actual sensory impression. Persons blind or deaf, who imagine that they see objects or hear sounds, experience hallucinations. An illusion is a perception which is a false representation of a sensory impression. A familiar example is when the shadows of objects in a dimly-lighted room appear as fantastic shapes of men or beasts. Hallucinations and illusions may consist of perceptions relating to either of the senses, and they have a wide range as regards diversity. If recognized as hallucinations and illusions, they denote only error or disorder of the perceptive faculties. If, however, the false perceptions are believed to be real, they become delusions. A delusion, therefore, denotes disorder of other than the perceptive faculties of the mind, namely, of the reasoning powers or the understanding. Delusions have a wider scope than that of perceptions. Any false belief which exceeds the limits of sanity, is an insane delusion. An example is when an insane person in imagination is some distinguished personage, or even the Deity. Other examples are a belief in conspiracies to do him an injury, a conviction that duty requires a homicidal act, etc. Delusions, in this wide sense, enter largely into the diagnosis of insanity. Incoherence is the rapid succession of ideas without order or connection.

Insanity has numerous forms, and different authors differ as regards the number and classification of these. An arrangement based on the division of the mental faculties into the emotional, intellectual, and volitional, is open to criticism. The will can hardly be the seat of disorder independently of the intellect and the emotions. It may be doubted if insanity be ever purely intellectual. Speculative opinions or beliefs, be they never so irrational, in giving rise to insane manifestations, always involve the emotional faculties and the will. A natural division is into those forms which involve perversion with either excitement or depression, and those in which there is simple weakness, impairment or loss of mental powers. The first class embraces mania, and the several varieties of emotional and delusional insanity; in the second class are dementia, and idiocy or imbecility. The subdivisions of these classes, in some classifications, are few, and in others many. It conduces to simplicity, and suffices for practical purposes, to arrange all diversities under Mania, Monomania, Melancholia, Emotional and Impulsive Insanity, Dementia, and Idiocy. This arrangement will be here adopted. Cases of insanity are by no means always typical of these forms separately. One form may merge into another, and different forms are often blended. From their predominant characters, however, cases are in general easily referred to these subdivisions. Moral insanity, as a distinct variety, is not embraced in this arrangement. Whether it should be reckoned as such, or not, is a vexed question. The term denotes an insanity affecting, primarily or chiefly, the moral sense. Now, as regards the moral sense or conscience, different sane persons differ widely. In some there appears to be naturally a deficiency of this element of the mind; in others it is a predominating feature of the mental constitution. It is much affected by education. It may be suppressed and almost destroyed by the habitual repetition of criminal or immoral acts. It is involved in the different forms of insanity. In mania it is lost in the general derangement. In monomania it is subordinate to delusions, and to emotions or impulses in emotional or impulsive insanity. In dementia and idiocy it participates in the general weakness of the mental powers. While thus, perversions, impairment and loss of the moral sense are involved in the different forms of mental derangement, there seems to be no ground for recognizing as a distinct variety, moral insanity.

MANIA.

In this form of insanity there is perversion, with more or less excitement, of the perceptive, intellectual, and emotional faculties. It differs from monomania and melancholia in the absence of fixed or persistent delusions, and in complete disorder of the intellect. The capacity for reasoning and attention is lost. Ideas and emotions occur without any order or connection. The will has no power to co-ordinate and control the actions of the mind. It is a condition of mental ataxia. There may be hallucinations and illusions, which are delusions, but transitory and variable. The mania may be acute or chronic.

Acute mania exists when patients are said to be raving maniacs, or stark mad. They are sometimes furious, attempting violence to those coming within their reach. In this phase the condition is analogous to that of excessive and ungovernable anger. An angry person who loses all power of self-control is, in fact, for the time being, a maniac. The extent to which accountability for acts then committed, is involved in the inability to preserve self-control, is a problem in morals; and it is a question in jurisprudence how far the protection of society demands punishment for overt acts committed under these circumstances. From a purely psychological stand-point, the quotation from Horace, *ira furor brevis est*, is the expression of a literal fact. In other cases, the manifestations of acute mania consist of ribaldry, obscenity, profanity—these being perhaps strikingly inconsistent with the character of the patient in a sane condition—boisterous laughter, vociferous outcries, abusive language, destructiveness as regards clothing, furniture, etc., entire indifference as to appearances, filthy habits, disregard of decency, etc.

The outbreak of acute mania is generally preceded by a period of deep mental depression (stadium melancholicum), and by sleeplessness. The latter symptom continues after the development of mania. Often, at the outset, maniacs do not sleep for several successive days and nights. Afterward the sleeping hours may be few, although there is constant physical activity with mental excitement during the waking hours. The countenance is expressive of various successive emotions—anger, terror, contempt, disgust, etc. The symptoms of physical disorder are in striking contrast to the psychical disturbance. The pulse is but little increased in frequency, the temperature is but slightly, if at all, raised, the appetite is often voracious, digestion is not disturbed, and nutrition may be well maintained. Instances in which the temperature of the body is much raised, involve either an essential or inflammatory fever, and the affection is not to be considered as functional mania.

In chronic, as in acute, mania, the disorder pervades the entire mind, with exacerbations or paroxysms of excitement occurring either spontaneously or whenever mental activity is aroused. Sooner or later the termination is dementia.

The diagnosis of mania, as regards the differentiation from the other forms of insanity, is easy, especially when acute. It is to be distinguished from the active delirium which is symptomatic of acute cerebral meningitis and hyperæmia of the brain, and from delirium ebriosum. The connection of the latter with alcoholic excesses suffices for its exclusion, and the two former affections are excluded by the absence of their diagnostic symptoms. Occasionally, maniacal delirium occurs in the essential fevers. These are, in like manner, excluded by the absence of their diagnostic symptoms. A high temperature shows either an essential fever or acute inflammation, with which the mania is associated if it be not a symptom.

Mania is sometimes feigned in order to escape conviction for crime, to obtain a discharge from military service, or to secure exemption from judicial penalties. The irrational and violent manifestations may be imitated. The physiognomical expressions, however, are not easily assumed. The premonitory melancholic stadium is likely to be omitted. Malingerers are unable to maintain the sleeplessness of maniacs. They cannot sustain the prolonged excessive activity of mind and body which characterizes certain cases; the resolution and endurance give way if the exertions are voluntary for the purpose of deception. They who feign madness are apt, like poor actors upon the stage, to overdo the part which they have undertaken to perform.

MONOMANIA.

This form of insanity is characterized by fixed and more or less persistent delusions limited to certain perversions of ratiocination. It differs from mania in the fact that the mental derangement is confined to particular ideas, these differing widely in different cases. Patients are insane in regard to some subjects. In this point of view the insanity is partial, not general. Exclusive of the delusions in which consists the evidence of insanity, there may be no manifestation of unsoundness of mind. It is, however, rarely, if ever, true that, in other respects, the mental powers are unimpaired. The professional judgment of a lawyer, physician, or clergyman, who believes that he is a tea-pot, or that his legs are made of glass, is hardly entitled to the same confidence as if these delusions did not exist. The extent to which monomaniacs are to be regarded as incapacitated for business transactions, such as the disposal of property by will or otherwise, is to be determined by circumstances in particular cases. In no instance can a monomaniac be said to be of a sound mind. As regards moral responsibility for criminal acts, there can be no room for doubt if these be connected with the delusions: if there be no such apparent connection, the question is to be decided according to the circumstances in each case. To establish the existence of delusions as evidence of insanity—in order to annul wills or contracts, to prevent the disposal of property, to restrict personal liberty in other respects, and as a defence in criminal prosecutions—is an object, in many legal cases, calling for medical testimony.

The delusions of monomania frequently involve hallucinations. These may relate to any of the senses, but especially to sight and hearing. Monomaniacs have visions of persons absent or dead, of supernatural beings, and of other worlds. They hear voices, and their actions may be governed by commands of imaginary beings either seen or unseen. These commands may lead to homicide or suicide.

Delusions which involve neither hallucinations nor illusions are of a diversified character. The belief of monomaniacs that they are illustrious personages—kings, queens, etc.—is not uncommon. They may believe themselves to be Christ or the Deity. On the other hand, an occasional delusion is the belief that they are possessed by the Devil, or that they are the

Devil incarnate (dæmonomania). They may fancy themselves some one of the inferior animals—the wolf, lion, dog, etc.—or an inanimate object, such as a tea-pot, or that their legs are made of glass, etc. It is a frequent delusion that certain persons, generally relatives or friends, have formed a conspiracy against them (monomania of persecution).

Monomaniacal delusions may relate to either poverty or riches. Men of wealth imagine that they have become poor. In a case now under the author's observation, the patient, a man of large means, endeavors to deny himself not only luxuries, but needed comforts, under the belief that he has become impoverished. In this case, symptoms denote incipient dementia. A friend of the author, a man of fortune retired from business, and remarkable for mental vigor, from time to time conceived the idea that he was reduced to poverty. He was, however, always convinced of his delusion by his secretary preparing an exhibit of his possessions; and his paroxysms of monomania on this subject were never known without the circle of his intimate friends. The delusion of riches is not rare. Persons in poor or moderate circumstances imagine they have come into possession of large or immense wealth. They indulge in extravagant expenditures, incur immense debts, make large contracts, and promise munificent gifts. During the late civil war, the author signed the certificate of insanity in a case characterized by this delusion. The patient, a merchant, shortly before his committal to an insane asylum, had telegraphed to his English correspondents to purchase an enormous quantity of cotton. The purchase was made, and proved a successful speculation.

An insane delusion may relate to an imaginary past event. Prof. Fordyce Barker has reported the case of a young woman of irreproachable character, who, directly after the marriage ceremony, declared to her husband that she was impelled to make a confession of her having had sexual intercourse with a certain gentleman, and that she was pregnant. The marriage was not consummated, and for several months the unhappy wife lived in seclusion, preparing for her confinement. A tympanitic distension of the abdomen caused an appearance which corresponded with her statements. Prof. Barker was called to attend her at the accouchement, and on examination found unequivocal proof of virginity. It was ascertained that she had never spoken to the person whom she had designated as her seducer, and that he did not know her by sight. After recovery from a severe attack of pneumonia, the delusion passed away, and the abdominal tympanites disappeared. She was united to her husband, and nothing afterward occurred to mar the happiness of married life.[1]

Delusions in regard to pregnancy are sometimes encountered. The author was once called to attend a patient in labor. He found the patient with a bevy of neighbors to render assistance. The patient was extremely thin, and the abdomen perfectly flat; there had been no interruption of the menses, and no other symptom of pregnancy.

In certain cases the so-called homicidal and the suicidal mania are referable to delusions which do not involve hallucinations. An insane lusion may lead persons to believe that an imperative duty requires hem to assassinate kings and rulers. A fond mother may destroy her children, in order that they may escape the trials incident to this life. A suicidal act committed under the influence of modern spiritualism, in order to join deceased relations or friends, is an example of an insane delusion. It is safe to say that they who kill or attempt to kill their families and destroy themselves, are monomaniacs. It is a question whether suicide is always proof of insanity. In most instances, doubtless, self-destruction is a result of either monomania, melancholia, or an insane impulse. It is doubtful if insanity exist in some instances, as when death is deliberately preferred to disgrace, when one who is condemned to die, anticipates the execution of the sentence, and when the suicide is committed for the benefit of others. As an illustration of the latter, a person was found dead from a pistol ball, the weapon being near the body. The person, shortly before this event, had insured his life largely in different companies. The payment of the insurances was refused on the ground that the case was one of suicide, the circumstances having been planned to make it appear to have been a homicide with robbery of bonds representing a considerable sum of money. The alleged motive was the benefit which his family would derive from the proceeds of the policies.

---

[1] *Vide* Journal of the Gynæcological Society of Boston, May, 1872.

The diagnosis of monomania is rarely difficult. In most cases the manifestations are such as to render its recognition easy. A point of inquiry in some instances is, whether recognizable delusions exceed the undefinable limits of sanity; in other words, whether they are sufficient for a person to be declared insane. Their character and consequences, together with other circumstances, in particular cases, must govern the decision. But there are cases in which patience and tact are required, in a medical observation, to obtain proof of delusions. Some monomaniacs are suspicious, and conceal their delusions in an interview with a physician. The first object should be to disarm distrust and secure confidence. The topics which relate to the supposed delusions should be approached gradually and incidentally. If the person examined admit ill health, it is suggested, as a good plan, to ask for a full written statement of symptoms. The evidences of delusions will be likely in this way to be brought out. A physician of engaging address may succeed, when one whose manners are cold or blunt will fail.

MELANCHOLIA.

Melancholy has already been considered as a morbid affection embraced in the neuroses (*vide* page 645). When it exceeds certain limits it becomes one of the forms of insanity. Here, as with regard to other forms of mental derangement, the dividing line between sanity and insanity cannot be drawn with exactness. In general terms, if the condition of the mind involve extravagant delusions, or, if, without these, the sentiments, intellect, and will are held in subordination by the intensity of gloom, the patient is insane. The distinctive feature of this form is perversion with depression. The term depression does not imply weakness or decay of the mental faculties. Melancholia is therefore distinct from dementia.

The condition of mind may be one of intense anguish or despair, having relation to no definite ideas. The patient assigns no cause therefor. There are in some cases wringing of the hands and other demonstrative manifestations of the deepest mental distress. In other cases, patients remain quiet and apathetic, sometimes maintaining constantly the same attitude, the physiognomy expressing the mental condition (melancholia attonita). Suicide may be resorted to simply for relief from the intensity of mental suffering.

Delusional melancholia might, without impropriety, be considered as a variety of monomania. The delusions may relate to the physical condition, constituting hypochondriacal melancholia. A patient who lives in constant mortal fear of death, or who imagines some fantastic malady, and who cannot be made to abandon the delusions by either reasoning or assurances, the delusions dominating the intellect, sentiments, and will, is affected with melancholy and hypochondrism exceeding the limits of sanity. More frequently the insane delusions have reference to the moral or spiritual condition. The mind is overwhelmed with self-condemnation; the unpardonable sin may have been committed; the soul is lost beyond redemption, and there is no hope of happiness here or hereafter. This constitutes religious melancholia. It is often an effect of injudicious religious teaching, and of the excitement caused by fanatics. Cases of hypochondriacal and religious melancholia might properly be called cases of monomania.

Suicidal melancholia is sometimes an effect of the knowledge of the existence of a fatal disease. A hospital patient of the author, having been confined to the bed for a long time with fibroid phthisis, terminated his life by cutting his throat, in a fit of despondency caused by the hopelessness of his disease.

Melancholia is sometimes preceded and accompanied by hysterical manifestations. The term hysterical melancholia might be applied to cases which are occasionally met with in medical practice. The melancholic condition, as incident to hysteria, is generally of temporary duration.

The diagnosis of melancholia is rarely attended with difficulty. Patients seldom undertake to conceal their mental condition, and its diagnostic characters are unmistakable. In general, the only point of inquiry which involves doubt and delicacy of judgment, is whether the melancholic condition exceeds the limits of sanity.

Emotional and Impulsive Insanity.

In this form of insanity, emotions or impulses overpower the intellect and the will. The moral sense may be subverted, and this is implied by the term moral insanity. The moral sense may be a feeble obstacle to the insane emotions or impulses, owing to a congenital deficiency, defective development from the want of cultivation, and impairment by habits of immorality; but the derangement does not have its point of departure from this element of the human mind, nor is the intellect or the will the primary seat. They are affected secondarily. When immoral acts are committed under the domination of insane emotions or impulses, the effect of these upon the conscience is to prevent any feeling of remorse, the understanding is rendered incapable of correct judgment, and volition is powerless. The intellect and the will, as well as the moral sense, are the more easily subverted the weaker they are, either naturally or from the various circumstances affecting their development and strength.

The acts proceeding from this form of insanity are determined by the character of the insane emotions and impulses. Destructive acts are homicide, suicide and a propensity to burn (Pyromania). Other acts relate to the sexual system (Erotomania). An insane propensity to steal (Kleptomania) proceeds from this form. Writers include with the foregoing an irresistible craving for alcohol (Dipsomania). A craving for opiates, equally irresistible, is, not less than the latter, attributable to an insane impulse.

Homicidal mania is, properly, an insane propensity to murder. It differs from homicidal monomania in this: the latter involves insane motives or objects, that is to say, delusions. A monomaniac commits homicide from the belief that he is performing a duty, perhaps in obedience to a command from a superior being. The act may be committed under a delusion that it is necessary for self-protection. A homicide committed under the influence of an insane emotion or impulse, involves no motive but the gratification of a propensity, and has no object beyond the act itself; there is no delusion connected with it.

A homicide may be committed from a sudden, momentary impulse. Persons are sometimes conscious of such impulses, which they are able to resist, but suffer from the apprehension that their self-control may give way, and for this reason beg to be protected against themselves. A middle-aged, respectable married woman, with whom the author had been long acquainted, manifested such changes in disposition and character, that her husband was led to suspect mental derangement. While conversing with her alone, with a view to ascertain her mental condition, she suddenly started from her chair, her face assumed an expression of ferocity, and she exclaimed, with a loud voice, "I feel as if I must kill somebody." This took place while talking with entire calmness, and without anything having been said to occasion irritation. In a moment she became quiet, and talked calmly as before. Confinement in an insane asylum was advised in this case, but proceedings were delayed; there was no publicity, and, after some months, the author was informed by her husband that all evidence of mental disorder had disappeared.

The following case which came under the author's cognizance, illustrates the commission of homicide from an insane impulse, under circumstances which seemed to indicate that it was a premeditated act: A middle-aged farmer, much respected, and not suspected by his neighbors of unsoundness of mind, was on ill terms with another farmer living in an adjoining town, for the reason that the latter had broken off a marriage engagement with his sister. Sitting in his house on a summer's day, he saw the man, from whom he considered that his family had received an indignity, slowly driving by; he instantly seized a loaded gun, advanced deliberately to within a few feet of his victim, and discharged the contents of the weapon into his abdomen. He returned quietly to his house, and directed his son to go for a doctor. He manifested no remorse. On the trial for wilful murder, it appeared that he had for some time been sleepless, and often wandered about his grounds in the night time with a loaded gun. In other respects he had evinced to his family and relatives conduct at variance with his former character and habits. The rupture between himself and the murdered man had taken place for a considerable period prior to the homicide. On these facts, together with expert testimony, he was acquitted on the ground of insanity.

It is a matter of notoriety that juries will not convict of wilful murder a man who kills the seducer of his wife, sister, or daughter, nor a woman who kills the man by whom she has been dishonored. As a rule, homicide, under these circumstances, is an act proceeding from emotional or impulsive insanity. The act is without rational motive or object, and without delusion.

It is possible that homicidal acts may proceed from an overpowering sentiment of benevolence. Many years since an account was published of a priest who had committed several murders for the sake of robbery. When at length he was discovered, his exclamation was, "What will my poor people do!" He was, apparently, impelled to kill and rob in order to obtain means for charity.

The diagnosis of homicidal mania is obviously of the utmost importance in its medico-legal relations. The circumstances connected with the act, absence of motive or object, etc., have great weight. The absence of remorse after the homicide, is an important point. Generally, when the act is accidental or in self-defence, or the result of a duel, it is followed by remorse. It is rarely, if ever, the case that a close investigation will fail to reveal evidences of mental derangement, aside from the circumstances connected with the act, although not apparent to ordinary observation. A hereditary tendency is to be considered. If it be true that persons guilty of wilful murder sometimes escape conviction on the plea of insanity, it is also true that persons are sometimes convicted and suffer the extreme penalty of the law who should have been acquitted on that plea. Instances of the latter could be cited from the criminal records of this country. Mania and impulsive insanity, of temporary duration, sometimes follow an epileptic paroxysm. If a homicidal act have been preceded by an attack of epilepsy, this fact is presumptive evidence of mental derangement, and especially so if the latter have been known to follow previous attacks. If the author of the homicide were not under observation for some time prior to the act, it is to be considered that an epileptic paroxysm may have occurred, without leaving any traces of its occurrence.

Suicide may be a result of delusions (monomania), or of a degree of despondency which renders life intolerable (melancholia). It may also be a result of emotional or impulsive insanity. In cases of the latter, as in those of homicidal mania, the suicidal act is without motive, object, or delusion. Favorable circumstances appear sometimes to determine the act of self-destruction from a sudden impulse. One who commits suicide by springing through an open window, plunging into water from a vessel or the bank of a river, rushing before a locomotive, may not have premeditated the act. The idea suggests itself at the instant, and an irresistible impulse is excited. Perhaps there had been no marked manifestations of insanity prior to the act. Not infrequently an impulse is felt which is not sufficient to overpower the will. A lady, who at that time was not regarded as insane, said to the author that she could not come near an open window without feeling a strong impulse to avail herself of the opportunity for self-destruction, although there was no persistent suicidal intention. She afterward became unmistakably insane. Not a few suicides are caused by a transient emotional excitement. Patients are often admitted into Bellevue Hospital having attempted suicide by taking opium or arsenic, and recover under appropriate treatment. The author has repeatedly interrogated these patients after recovery as to the causes which led to the act; and, generally, it is attributed to a domestic quarrel, a fit of jealousy, or a sudden disappointment in love. As a rule, they seem pleased that the attempt failed, and readily promise not to repeat it. These are to be regarded as cases of emotional insanity. The following is an illustrative instance: In 1854, the author became acquainted, in Paris, with a middle-aged gentleman of refined taste and literary culture, who within a few years had become totally blind. He had lately married; his wife was apparently devoted to him; his means were ample; and his life seemed to be one of contentment. In that year an industrial *Exposition* for all nations was held in Paris, and the buildings were close to the banks of the Seine. He attended the opening in company with his wife and her sister. He became separated from them in the crowd. They endeavored to find him, but in vain, and they concluded that he had taken a carriage and returned home. He was not at home when they returned, and was absent during the night. No trace of him was discovered on the next day, but, on the day following, his body was in the morgue, having been recovered from the Seine. There had been no manifestations of insanity or mental depression; and the rational conclusion was that, finding himself separated in the crowd from his family, the feeling of the loneliness and dependence incident to his blindness induced an emotional disturbance which impelled to suicide. The drowning could not be attributed to accident.

A liability to suicidal impulses in any case can only be ascertained by the occurrence of attempts at self-destruction and the confession of the patient.

An irresistible impulse to burn buildings is a species of destructive insanity. Other destructive acts belong in the same category, such as destroying, by means of vitriol, dresses worn by ladies in the street, cutting off long tresses, etc. There may be but a single impulse to a particular destructive act, or impulses may be repeated so as to constitute a propensity. They gain in strength by their repetition. Particular acts of destructiveness may constitute apparently the only manifestation of insanity; but generally, if not invariably, proper investigation will disclose other evidences of unsoundness of mind. These are of essential importance with reference to a plea of insanity in criminal trials. They sustain this plea, taken in connection with the absence of appreciable motive or object in the commission of the act.

It does not invalidate the diagnosis of impulsive insanity that, in the execution of a destructive act, much deliberation and ingenuity are sometimes displayed. An insane impulse may be of momentary duration, or it may persist indefinitely. If it eventuate in an insane act, the intellect is overpowered, not destroyed. It is perfectly consistent with impulsive insanity that reasoning and contrivance are brought into requisition in the acts to which it leads. In these cases, the insane impulses may be said to compel the intellect to do their bidding.

An insane impulse to steal (kleptomania) is undoubtedly a verity. When persons steal with no rational motive or object, insanity is to be inferred. It is absurd to suppose that sane persons will run the risk of the penalties for theft, and steal articles which are superfluous or of no value to them. It does not militate against a plea of insanity that articles are adroitly stolen, and that pains are taken to conceal the thefts. The kleptomaniac is by no means incapable of appreciating the importance of avoiding detection. The intellect is not destroyed, but overpowered, by the insane impulse; the will is governed by the latter, and not by the former.

Kleptomania is sometimes paroxysmal. The following instance was related to the author: A young married woman of wealth and high social position, during pregnancy, was seized with an uncontrollable passion for stealing silks, laces, etc., of a red color. Her habit was to visit shops ostensibly to make purchases, and carry away articles concealed about her person. When detected, it was found that she had in her possession a large quantity of articles stolen in that way, all of a red color. They were returned with ample indemnification to the owners. After her confinement the kleptomania disappeared; but it returned with the same characteristics during a subsequent pregnancy.

The following instance came under the author's cognizance: A widow, about fifty years of age, much respected as a faithful, conscientious nurse, who was suffering at the time from troubles affecting the uterus and bladder, was detected in shop-lifting. On a representation of her previous character, the complaint was withdrawn, and she was released from prison. When asked what motive led her to attempt to commit the theft, the answer was that she could give no reason for the act, except that she was tempted by the Devil. Some years afterwards she was detected in a similar act. On searching her apartment, a large collection of articles was found, of no practical use to her, and which she had not attempted to sell, although pressed for the necessaries of life. The case was recognized as one of kleptomania, and not brought to trial.

A morbid exaggeration of the sexual passions in either sex, to such an extent as to overcome moral and intellectual restraint, is a variety of emotional insanity (erotomania). There can be no doubt of insanity when a woman, not abandoned to prostitution, either solicits or invites by lascivious actions sexual intercourse. This is known as nymphomania. The passion in these cases subverts the sentiments of modesty and shame, which are strong feminine instincts. To what extent moral responsibility is involved in yielding to passionate desires under temptations, it is not easy to say. This is a question of mental pathology, as well as of ethics. It is difficult to indicate a line beyond which passion becomes an insane impulse. In men, erotomania is distinguished as Satyriasis. The sexual instinct in a man may overcome all resistance from the understanding and the moral sense. Juries are not likely to consider favorably the plea of insanity in cases of rape or indecent assaults; yet, in a certain proportion of these, regarded from a medical standpoint, the plea is a valid one. The sexual passion manifested by a woman for one of her own sex, is a phase of erotomania, as also the analogue in man. The instances of sexual intercourse with inferior animals, and the bodies of the dead, admit of this interpretation.

Erotomania, devoid of the gross sensuality which characterizes the varieties just referred to, exists when love for a person, real or imaginary, absorbs the attention and controls all the faculties of the mind. The amatory persecutions of men for women with whom perhaps they have no acquaintance, and *vice versa*, are instances of this variety of emotional insanity, which may be distinguished as sentimental erotomania.

DEMENTIA.

Impairment of the mental powers, the degree of feebleness falling below a sane condition, is dementia. The demented condition approximates to that of sanity, in slight or incipient dementia; in the other extreme, namely, in complete dementia, the mental powers are but little, if at all, superior to those of the more intelligent of the brute creation. There are different gradations between the two extremes.

Cases of dementia, considerably advanced although not complete, are easily diagnosticated. The most noticeable feature is the impairment of memory. Recent events are forgotten, while those which occurred in early life may be recollected. Intimate friends and relatives may not be recognized. Patients forget the number and names of their children, whether their parents or their brothers and sisters are living or not, etc. Perceptions make but a transient impression on the mind; questions are repeated which had been answered a few moments previously. Their interest relates chiefly to personal wants and necessities. They give little evidence of reflection or reasoning. Their attention is occupied with trifles, or the mind is in a state of vacuity. The mental condition is like that of the child or the infant. They are placid and amiable, or irritable and morose, according to their previous dispositions and habits of mind. Now and then, in the progress of dementia, flashes of former intellectual brightness may appear, contrasting strangely with the habitual mental inanity.

In a large proportion of cases the diagnosis of insanity has been made prior to dementia, this being the termination of the other forms of mental derangement, when they do not end in recovery (secondary dementia). In the majority of cases other than these, the dementia is the result of the decay of the mental faculties which is incident to old age (senile dementia). The instances of primary dementia in early or middle life, are comparatively few.

The cases of dementia offering difficulty as regards the diagnosis, are those in which the affection is near the border line dividing sanity from insanity. What degree of impairment of the mental powers carries with it incompetency for business transactions and, in a legal point of view, irresponsibility? This question cannot be answered by laying down abstract rules. Practically, the question whether dementia exists or not, must be determined by the exercise of knowledge and good sense in judging of the circumstances in individual cases. There is no fixed standard of the mental powers by comparison with which this question is to be decided. A medical examination with reference thereto should be directed to the memory, the ability to concentrate the attention, and the faculty of ratiocination, taking into account the previous mental status of the person as determined by native endowments, education, and intellectual habits. The examining physician is often placed in a delicate position. It is not a matter of small moment to a person to be declared insane. Prodigality, munificence, mismanagement of affairs, an ill-advised marriage, are not, in themselves, proofs of insanity; but they are among the circumstances which may lead interested parties to bring a charge of unsoundness of mind. On the other hand, justice may demand that cases of actual dementia should be legally recognized as such. The course of the physician is plain. He is to form an impartial opinion in each case, exclusively on its merits, without regard to the consequences.

Idiocy. Imbecility.

Idiocy is congenital deficiency of the mental powers. In an extreme degree, mind is nearly, if not totally, wanting. There may be no evidence of consciousness, or of voluntary movements. Between this degree and a low development of intelligence, there are different gradations. The idiotic condition is associated, in some cases, with an extremely small head (microcephalic idiocy), and in other cases with enlargement of the head from hydrocephalus. Not infrequently an arrest of development is manifest in the entire body, or in certain organs, other than the brain. The deficiency of the mental powers is apparent in idiotic infants. They are slow in learning to walk, and in acquiring speech. The lack of intelligence is shown by the countenance and in various ways. The diagnosis is easier after infancy, and the degree of idiocy is evident during childhood and youth.

Imbecility denotes a deficiency of the mental powers, less in degree than in idiocy, due to causes operative after birth and during infancy. Imbeciles are known as half-witted, feeble-minded, innocents and fools. As regards the intellectual and the moral faculties, different cases differ much in the degree and the kind of imbecility. Having the advantage of the history from childhood, there is, in most instances, no difficulty in making a diagnosis. The cases which present difficulty are those of a degree of imbecility not much below the confines of sanity. With reference to a capability of taking care of property, or managing affairs, and also responsibility for conduct, it is sometimes a legal question whether or not a person be *non compos mentis*. This question cannot always be decided by a cursory examination. An imbecile in such an examination may give no proof whatever of imbecility. An illustration of this fact, which came under the author's observation, is as follows: A man of mature age had always been considered by his family and others as an imbecile. His father, who had a large estate, died without leaving a will. A legal investigation was instituted, with a view to place his share of the estate in the hands of a trustee. This was opposed, and eminent lawyers were employed to resist it. On a long examination by the late Professor Gilman and the author, no evidence of defective intelligence was elicited; the answers to questions indeed showed considerable brightness of intellect. A private journal which he had kept for a long time, his habits and past conduct, however, rendered it clear that he was an imbecile, and testimony to that effect was given. He was adjudicated competent to take possession of the property to which he had fallen heir. His subsequent history afforded abundant evidence that the adjudication was an error. It is a curious fact that imbeciles may possess remarkable musical genius. Of this fact the negro known in this country as "Blind Tom," born in servitude, is probably a notable example.

With imbecility as involved in Cretinism, we have, in this country, no practical acquaintance. It is endemic in certain countries, more especially in Switzerland. The Cretin is a dwarfish, deformed being, more or less an imbecile, and, in a considerable proportion of cases, goitre accompanies the mental and physical defects.

Treatment of Mental Diseases.

Most cases of insanity, in this country, are treated in institutions, either public or private, devoted to this class of diseases. Asylums for the insane fulfil an object in the treatment, generally of fundamental importance, namely, removal of the patient from habitual associations. They withdraw the patient from causes of excitation to which they are exposed elsewhere; secure the requisite seclusion and repose; provide appropriate occupations and amusements; afford protection against self-injury, as well as injury to others; and, lastly, they have the great advantages arising from the treatment by those whose studies and experience have had special reference to mental diseases. The measures, moral, hygienic, and medicinal, which constitute the treatment of the different forms of insanity in asylums, will not be considered in this work, inasmuch as they are not embraced within the scope of general medical practice. Their consideration belongs to treatises on insanity. Limiting attention to points relating to duties which all physicians are liable to be called upon to perform, they are as follows: The preventive treatment, the indications in the early stage of insanity, and the removal to an insane asylum. With reference to these points, the different forms of insanity will be considered separately, after some general remarks.

Preventive treatment should engage the attention of every practitioner. Physicians to asylums for the insane rarely have the opportunity to forestall the occurrence of insanity. Patients come under their observation only when insanity is already developed. The preventive treatment must generally fall within the range of general practice. Hence, the importance of recognizing premonitions and the earliest manifestations of mental derangement, by those who do not assume to be specialists in this department of practice. The attention should be alive to these, particularly when there is reason to suspect a predisposition to insanity. The evidences of what has been termed the "insane diathesis," are to be considered. These differ according to the tendency to the different forms of insanity. It behooves the practitioner to take cognizance of moral or physical causes operative in particular cases, in order, if possible, to effect their timely removal. Gynæcological writers (Prof. Fordyce Barker, and others) have lately called attention to the reflex agency of diseases of the sexual system in women in causing insanity. Hyper activity of this system in men, with either excessive indulgence, unnatural abuse, or continence, may be causative. Over-mental activity and deficient exercise of the mental faculties, are among the causes. Undue bodily fatigue and muscular inactivity may enter into the etiology. Occupations which involve intense exertion of the mind, with excitement, limited to certain objects, such as the accumulation of wealth, may lead to insanity. Alcoholism is an active factor in some cases. In most cases, symptoms denoting functional disorder of the brain precede, for a greater or less period, those which declare that the patient is no longer to be considered sane. While proper cognizance should be taken of these causes, the physician should be extremely cautious in giving any intimation to patients of a supposed tendency to insanity. It is rarely the case that the evidenee of such a tendency is sufficiently positive to render it proper to subject the patient to the apprehension of so terrible a calamity.

It is of great importance to recognize the earliest manifestations of mental derangement. In most cases where insanity is evidently developed, the previous history shows that it had really existed for a greater or less period. Physicians are not often enough consulted during the period when the development is taking place; and if consulted, they are perhaps apt to give too little heed to the symptoms which denote disorder of mind. Notable changes in ideas, disposition and conduct—changes which are in contrast with the previous character—and sleeplessness, should excite attention as possibly indicative of incipient insanity. If recognized before it has reached a degree which renders its existence obvious to every one, its further progress may perhaps be averted by timely measures of treatment.

Committal to an institution is often a step of great importance and delicacy. It is a misfortune for those who recover, to have been an inmate of an asylum for the insane. They are apt to be painfully aware of the distrust and suspicion with which they are afterward regarded. It would be a sad mistake to have needlessly or improperly subjected a patient to this calamity. On the other hand, to incur risk of self-destruction, or of homicide, by not placing insane patients in an asylum, would be culpable, to say nothing of the injustice of depriving them of its advantages for recovery. These considerations enforce the need of attention and sound judgment on the part of the physician.

Acute mania is preceded by mental depression for a variable space of time, which has been termed the period of incubation. Mental depression occurs often enough without acute mania; but that the latter may possibly follow, is to be borne in mind. On the outbreak of maniacal excitement, immediate removal to an asylum is not advisable, provided circumstances admit of appropriate treatment at home. The mania may be of temporary duration, and the stigma of the asylum may perhaps be avoided. The patient should be placed in charge of competent attendants who are not relatives nor friends. Removal becomes advisable when it is settled that the mania tends to continue, or to recur after brief intervals. This course is to be advised at once, if circumstances do not admit of appropriate home treatment.

The objects of treatment are to tranquillize and procure sleep. Seclusion and quiet are essential. If the symptoms denote cerebral hyperæmia, saline cathartics, cold to the head, stimulating foot-baths, the bromides and arterial sedatives—digitalis, aconite, or the veratrum viride—are indicated. Antimony, as a nauseant sedative, is useful in certain cases, but not given in the enormous doses heretofore recommended. Venesection, in any case, at the present day, is considered as inappropriate; but the abstraction of blood by cupping or leeches, is sanctioned by good authorities. The objects are sometimes effected by opium. The various antispasmodics, valerian, assafœtida, musk, etc., have a certain measure of usefulness. Trial may be made of chloroform by inhalation, or the chloral hydrate. The different remedies may be combined, according to the indications, together with the results of experience in each case.

Cases of chronic mania are to be treated in asylums.

Acute mania often ends in recovery. The prognosis is favorable if it occur in the puerperal state, and, also, if it be associated with hysteria. It is of temporary duration if it follow an epileptic paroxysm. It is more likely to end in recovery in women than in men. If it become chronic, the prospect of recovery is small.

In the treatment of cases of monomania, the propriety of removal to an asylum will depend much on the character of the delusions. If the tendency of these be destructive, as a rule, the removal is desirable; but it is otherwise if they are harmless in character, provided appropriate measures are practicable. These measures are proper attendance, and change of scene under constant medical supervision. Travelling, accompanied by either a physician or a judicious companion, may prove a successful measure of treatment. Mental occupation which interests the attention and diverts from subjects relating to the delusions, is an important object in the treatment. The successful treatment of any coexisting and perhaps causative physical disease, and improvement of the general condition, are important objects calling for appropriate therapeutic and hygienic measures.

The foregoing remarks in relation to monomania, are applicable to melancholia. The successful treatment of cases in which melancholy exists in a degree not exceeding the limits of sanity, is preventive of insanity. There is reason to believe that timely medical advice would often prevent suicide. Well managed private institutions for the treatment of nervous diseases, not known as asylums for the insane, are well suited for cases of melancholia.

As in cases of monomania, the prognosis in melancholia becomes unfavorable in proportion to the length of time it has existed. The probabilities of recovery are less in middle and advanced, than in early, life.

Emotional or impulsive insanity may often be arrested if attention be given to its earliest manifestations, and appropriate measures of treatment pursued. Minor manifestations generally precede grave effects such as homicide or suicide. Relief from any coexisting affections, improvement of the general health, withdrawal, if possible, from any of the causes of insanity which have been named, if they be found to be operative, recreation, change of scene, etc., are the measures indicated. If they can be properly carried out, they should be fairly tried before committing patients to an asylum. The treatment should include close observation lest there be an outbreak of destructive impulses. If these occur, or if a tendency thereto persist, the protection of an asylum is requisite.

Dementia occurring as a termination of other forms of mental derangement, is almost hopeless as regards either recovery or improvement. The same must be said of senile dementia. Primary dementia, resulting from a moral shock, is less discouraging. The object of treatment, in addition to indications derived from other parts of the organism than the brain, is the improvement of the mental condition by judiciously regulated exercise of the different faculties of the mind.

Senile dementia may be either prevented, postponed, or retarded by occupations which involve exercise of the mental faculties. This is a logical inference, on the one hand, from the fact that impairment of the mind is apt to follow the relinquishment of active pursuits, and especially if, after retiring from these, the unfortunate seeker after the enjoyment of ease has no mental resources; and, on the other hand, from the fact that they preserve longest and best the mental faculties who remain in pursuits which require mental activity. The functional capacity of the brain, not less than the power of the muscles, deteriorates from disuse. Occupations which call into activity, within proper limits, and in due proportion, the intellectual and moral faculties, constitute a fundamental condition of mental health. Were these axioms fully and generally carried out, not only would the number of cases of senile dementia be diminished, but, in other ways, the sum of human happiness increased.

Removal to an asylum is a great blessing when patients with dementia cannot be otherwise properly cared for. The comforts of an asylum, however, are not to be compared with the tender care of affectionate relatives or friends. If the patient be not so far demented as to be unable to appreciate the associations of home, necessity is the only justification for removal. It is painful to think of patients being committed to an asylum simply because they are troublesome; and it is a shocking idea to separate them from their brothers, sisters, or children in order that they may lose all recollection of those to whom they are so nearly related—in other words, with the purpose of rendering the dementia more complete. There are instances in which this unnatural idea has actuated removal.

Idiocy or imbecility has claims upon compassionate interest and the tenderness of relationship, which need not here be expatiated upon. The treatment consists of efforts to develop, as far as possible, the defective mental powers. Educational institutions for this end have accomplished much, and are to be classed among the fruits of modern science and philanthropy.

Questions relating to insanity enter largely into medical jurisprudence, and the general practitioner cannot altogether ignore them on the ground that they belong to a special department of medicine. Whether a person be insane or not, is a question which every physician is liable to be called upon to form an opinion with reference to a legal committal to, or release from, an institution for the insane. He is to be alive to the fact that his opinion may be sought after for purely selfish and mercenary motives. It is probably very rarely the case, in this country, that sane persons are deprived of their liberty on the ground of insanity; but instances are possible. In forming an opinion the physician must be careful not to place undue reliance on the statements of interested parties. He must be guided by well-attested facts, and especially those which he is able to verify or corroborate by his own observations.

Alleged insanity is the pivot on which turns many civil suits in law. Generally these relate to property. Was the mind of the testator or testatrix sufficiently sound to render valid testamentary bequests? Is there proof of mental incapacity for the disposal of property during life? Is an inheritance to be placed in trust for the reason that the heir is *non compos mentis?* Is a contract, gift, sale, or purchase to be set aside because made under the influence of an insane delusion, or in a condition of dementia? Insanity is not less frequently involved in criminal cases. Was the mental condition such as to annul legal responsibility for homicide or violence, theft, rape, and other offences against the laws? These and other kindred questions call for medical testimony. Physicians, who do not profess to be experts, cannot, if they would, always escape being examined and cross-examined by astute lawyers who have perhaps given much study to insanity with reference to its legal relations. It is, therefore, desirable that students and practitioners devote a proper share of attention to this department of medicine on account of its legal bearings, as well as its importance in medical practice.

It is often remarked that in legal cases which involve questions in medicine, both sides are apt to be represented by an equal array of medical testimony; and this is cited as exemplifying the proverb that doctors always disagree. There is ample room for disagreement as regards these questions in a considerable number of cases. That the opinions of physicians can be bought, is certainly a reproach rarely merited. But there is a source of unconscious bias which is to be mentioned, because it is to be avoided, namely, sympathy with the side in behalf of which the services of the physician have been secured. Brought into contact with those who are laboring to make the most of their case, and, perhaps, not cognizant of the facts on the opposite side, it is perfectly natural for the feelings to become enlisted in a way to affect, to a certain extent, the judgment. It were gratuitous to reason against this. Every one will admit that medical testimony should be impartial. The liability to bias is alluded to, not that the author feels called upon to explain the disagreements of doctors, but because, if duly recognized, the liability is likely to be successfully resisted.

SECTION SIXTH.

FEVERS AND OTHER GENERAL DISEASES.

PRELIMINARY OBSERVATIONS.

Fever, either symptomatic or essential—Nosological distribution of essential fevers—Blending of fevers—Infectious and contagious fevers—Temperature in fevers—Antipyretic treatment of fevers—Cold baths—The wet sheet—The wet pack—Quinia—Salicin—Salicylic acid—Digitalis—Veratria.

THE term fever denotes either a symptom or a disease. It is a symptom when secondary to, and dependent on, an acute inflammation. It is then called symptomatic fever. It is a disease when not referable to any local affection. The name essential fever expresses the latter fact. The name idiopathic fever has the same meaning. Clinically, fever is to be regarded as essential whenever, on a sufficiently careful examination, no local affection is discoverable of which it is symptomatic. An essential fever is not infrequently associated with an acute inflammation, the latter developed secondarily as a complication. To determine that the fever is essential, it must be ascertained to have been primary, in other words, to have preceded the local affection. It may happen that an essential fever and an acute inflammation may occur coincidently, that is, they are concurrent without any pathological connection with each other. Generally, under such circumstances, the fever, in respect of intensity, is out of proportion to the nature or extent of the local affection. Moreover, an essential fever has usually certain distinctive traits, aside from intensity, and it is recognized by these. In most cases, with due knowledge and attention, it can be decided without much difficulty whether fever be symptomatic or essential.

The degree of fever, whether symptomatic or essential, is represented chiefly by the temperature of the body. This has become the criterion since the employment of the thermometer in medical practice, and it is in accordance with the etymological sense of the term fever which signifies heat. The practical use of the thermometer has been already considered (*vide* page 34). The fever is slight if the temperature be 100° or 101° Fahr.; moderate if 102° or 103°; considerable if 104°; high or intense if 105°; and the intensity very great or excessive if the rise exceed the latter.

There are different forms of essential fever, or, more correctly expressed, there are different essential fevers. These are distinct diseases, each having its own special cause; and they are severally distinguished by peculiarities relating to causation, duration, symptoms, pathological events, complications, sequels, and lesions found after death. By means of these peculiarities they are differentiated from each other. The essential fevers are to be considered in this section with reference to differential diagnosis and the treatment. The diagnostic characters of each are derived from the different sources just enumerated.

Fevers are nosologically distributed in three groups, namely, the continued, the periodical, and the eruptive fevers. They will be considered, with reference to diagnosis and treatment, as thus grouped. The diagnosis of these, as of other diseases, involves positive and negative facts. The first inquiry at the bedside is whether the fever be symptomatic or essential? Assuming this to be settled by excluding all local affections adequate to cause the fever, the next question is, in which of the three groups does the case fall, that is, whether the disease be a continued, a periodical, or an eruptive fever? Usually this question is easily answered. Then the diagnostic problem is to decide which one of either the continued, the periodical, or the eruptive fevers does the case represent. It is a convenient practical plan of clinical investigation to consider these points in the order in which they have been stated.

An importand fact, in relation to both diagnosis and treatment, is that different fevers may be blended. The physician has to deal sometimes with two fevers combined. A continued and a periodical fever may exist in combination, *e.g.*, typho-malarial fever. A continued and an eruptive fever may coexist, *e. g.*, diphtheria and scarlatina. Two eruptive fevers may concur, *e. g.*, rubeola and scarlatina. The Hunterian doctrine that two general diseases cannot be united has been disproved by clinical observation.

Fevers are infectious diseases according to the sense of the term infectious as used by many writers at the present time, that is, they are due to special morbific agents which, under certain favorable conditions, either within or without the body, are capable of increase or multiplication in an indefinite degree. Important distinctions relate to the infecting agents. It may be added that the doctrine which considers these as low organisms or germs affords the most satisfactory explanation of etiological and pathological facts. Indeed, it is not too much to say that, with our present knowledge, these facts can be interpreted in no other way than by the so-called germ theory. Calling the infecting agents germs (which is allowable in a figurative, if not in a literal, sense), the conditions for their reproduction may exist exclusively within the body; and they cause the diseases to which they stand in a special causative relation, without undergoing any change after leaving the bodies of those affected with these diseases. The diseases thus caused are contagious, and are probably never produced except by a contagium vivum. Examples of the purely contagious infectious diseases are variola, rubeola, scarlatina, and typhus fever. Other germs find the conditions for their reproduction wholly without the body. The infectious diseases caused by these are purely miasmatic. Examples are the malarial fevers and yellow fever. Again, other germs are supposed to be reproduced within the body, but, before they are capable of causing the diseases in healthy persons, they must undergo further development under conditions without the body.

As the ova of the tape-worm will not be developed into this parasite in the intestinal canal until it has become a cysticercus in the solid organs of another animal and been ingested, so, it is conjectured, these germs, after leaving the body, must reach a certain stage of development before they acquire an infecting power. Examples of the diseases which are in this way communicable are typhoid fever and epidemic cholera. They are distinguished as miasmatic contagious diseases.[1]

Irrespective of any theoretic interpretation of facts, the contagiousness or communicability of certain of the fevers, and the circumstances, so far as known, therewith connected, are practically important with reference to preventive measures. To prevent the communication of a disease is, of course, an object of importance. Hence it is desirable to know that certain diseases are communicable, and in what modes, in order to determine the measures of protection which are requisite. The contagium may be contained in a palpable morbid product, a virus, *e. g.*, variola, or in an impalpable form, a miasm, *e. g.*, scarlatina. An infectious miasm is operative within a certain area called the infecting distance. A virus or a miasm retains its infecting power for a greater or less period. Either may be transported in contact with material substances to places more or less distant (fomites). A certain degree of heat is essential to the existence of the yellow fever and the malarial germs, whereas others do not require this condition. These and other kindred points enter into the prophylaxis.

The temperature of the body, as measured by the thermometer, not only demonstrates the degree of fever, but it is often of much importance in diagnosis. The fever heat may be intense when the pulse and other symptoms denote only a moderate febrile condition. The frequency and other characters of the pulse, which formerly were depended on for determining the degree of fever, are by no means always in agreement with the temperature of the body. The pulse may be normal while the thermometer registers 105° Fahr. On the other hand, the pulse and other symptoms sometimes seem to denote high fever when the increase of temperature is small. Exact knowledge of the degree of fever cannot be obtained without the thermometer, and thermometric observations should therefore never be omitted. Different fevers have different laws as regards temperature; and the differential diagnosis may to a certain extent be based upon these. For example, an increase of temperature occurring in the forenoon or middle period of the day, on a series of successive or alternate days, denotes malarial fever; and the thermometer may show the occurrence of either a paroxysm or an exacerbation, when otherwise it would not have been determinable. It is, however, to be considered that the laws of temperature in the different fevers, as deduced from clinical observations, are liable to frequent deviations from various causes in particular cases. For instance, a gradual daily increment of temperature in the early part of typhoid fever distinguishes that disease; but individual cases not infrequently offer exceptions to this law.

At the present time, a high temperature is regarded as, in itself, furnishing an important indication for treatment, whatever may be the form of fever. The preternatural heat is supposed to be causative of pathological changes in the different organs of the body ("parenchymatous degenerations"), impairing their functions, and especially involving danger by its effect on the heart. Whatever may be the rationale, clinical experience affords indubitable evidence of the importance of lessening the hyperpyrexia as an object in therapeutics; hence, antipyretic treatment may be called for in all the fevers. The means for this end may be here stated, and simply referred to subsequently in connection with the treatment of the individual fevers.

---

[1] *Vide* Liebermeister in Ziemssen's Cyclopædia, Am. ed., vol. i.

The abstraction of heat by cold water applied externally, is the most effective method. In view of recent experience, it seems surprising that the remarkable success of Currie's cold water treatment, in the latter part of the last century, should have been lost sight of, especially when the "reports" of that conscientious physician contain such intrinsic proof of honesty that they are as valuable to-day as when they were published. The disuse of this treatment perhaps arose, in a great measure, from the severity of the method, which consisted in placing the patient in a tub, and pouring several pailfuls of cold water over the head and body. The late methods are less objectional on that score. They are the cold water bath, the wet sheet, and sponging the surface of the body.

In employing the cold bath, the patient is placed nude in a bath-tub containing water of about the temperature of 70° Fahr., and after remaining in the bath from ten to twenty minutes, removed to the bed, the body wrapped in a dry blanket. A little wine or spirit should be given on removal to the bed. The temperature of the body should be taken in the rectum before and shortly after the bath; it should be taken regularly either in the rectum or axilla, every two hours, during day and night, in cases which are likely to require repetitions of the bath. The bath should be employed whenever the axillary temperature reaches 103° Fahr. As a rule, the temperature begins to fall shortly after the bath, rising again after a variable period. Whether this period be long or short, the bath is to be repeated whenever the rise is to the point stated. Following this rule, the number of baths *per diem* will vary from ten to twelve. The cold water treatment, after this method, is not complete unless the rule be followed. To keep the body-heat as much below 103° as practicable, is the object of the treatment. Objections to the bath are the inconvenience to the attendants both in hospital and private practice, and the fatigue to the patient which it occasions. Generally patients submit to it with great reluctance. Although they may appreciate the good effect which follows it, usually much persuasion or authoritative direction is required for its repetition.

The wet sheet, sprinkling with cold water, being added, constitutes a method much more easily managed; it is unattended by fatigue, and is far less disagreeable to the patient. The patient is transferred to a cot covered with rubber-cloth, the body enveloped in a wet sheet, and the continued effect of cold kept up by sprinkling the body with cold water. After twenty or thirty minutes, the patient is placed in bed and wrapped in a dry blanket. This method is to be repeated as often as the temperature rises to 103° Fahr. As good results may be obtained by this method, as by the cold bath. The fever-cot, invented by the late Dr. Kibbee (whose life was sacrificed in the recent epidemic at New Orleans, to his conviction that, by means of his bed for refrigeration, the yellow fever would be rendered controllable), is well adapted to this method. It provides for the percolation of the water, and its conduction into a receptacle. The plan of maintaining a continuous effect by sprinkling with cold water, was introduced by the author into Bellevue Hospital in 1872, for the antipyretic treatment of cases of insolation.

A much simpler method is sponging the surface of the body with either cold or tepid water. Simple as this is, it may be made very effective. Exposing the naked body to the air, and continuing the sponging for half an hour or longer, a reduction of heat often follows nearly as great as after the cold bath or the wet sheet. It should be repeated whenever the temperature again rises. The author has found this method successful in the treatment of continued fever. It may be first tried, and the other methods substituted if it do not prove effective. It should be adopted in fevers affecting children, in preference to the other methods which are apt to cause apprehension and excitement.

Of the great efficacy of refrigeration by means of these methods in hyperpyrexia, the author can bear testimony from considerable clinical observation. That it produces, notably, a favorable modification of symptoms in cases of fever, with shortening of its duration and a diminished fatality, he entertains no doubt. In this country, owing to traditional ideas and popular prejudice, the cold water treatment has not, as yet, been very generally adopted in private practice. Physicians naturally, and, to a certain extent, properly, shrink from innovations which are likely to occasion censure if cases do not end favorably. It is also perhaps true that the unscientific and irrational employment of hydropathy has had some effect in rendering members of the medical profession tardy in recognizing fully the value of water as a potential anti-pyretic agent.

The "wet-pack" can hardly be considered as a means of employing cold water. This method consists in wrapping, in a sheet wet with cold water, the body which is then enveloped in dry blankets. The water becomes quickly warm, and the patient is then, in fact, in a vapor bath. This method produces perspiration which, as the author demonstrated many years ago by comparing the symptoms before and after the occurrence of spontaneous perspiration in continued fever, is generally followed by amelioration of the symptoms. It tranquillizes the patient, and promotes refreshing sleep. The author reported, in 1852, cases of continued fever in which this method was employed with notable benefit, and sometimes with the effect, apparently, of arresting the fever.[1]

Several drugs have an antipyretic effect. Of these the most potential are quinia, salicin or salicylic acid, and digitalis. Quinia (sulphate or muriate), as an antipyretic, must be given, to an adult, in doses of from one to two scruples. The quantity given should be either in a single dose, or in doses repeated within a couple of hours. Inasmuch as the tolerance of this remedy differs greatly in different persons, a scruple may be given at first, and afterward increased or not, according to the tolerance. It is most effective if given in the evening. Frequently, in the course of a few hours, the temperature is lowered several degrees, and it may fall to within the normal range. Trial should be made of this remedy, but the physician must not expect always to obtain by it the desired result. It fails entirely in a certain proportion of cases. If it prove effective, it may be repeated daily or every other day, according to circumstances. The employment of this, and the other antipyretic drugs, may be conjoined with the cold water treatment.

---

[1] *Vide* Clinical Reports on Continued Fever, based on an analysis of 154 cases, 1852.

Salicin and the salicylic acid are inferior to quinia as antipyretics, but they have considerable potency. According to Senator, the antipyretic effect of salicin, although less in degree, is longer in duration than that of quinia. Salicin and the salicylic acid are valuable when quinia is tolerated only in small doses. Salicin is more likely to be well tolerated than salicylic acid. Each may be given in large doses without toxic effects. The doses must be at least twice as large as those of quinia. In other respects they are to be given in the same manner as the latter.

Digitalis is far inferior to the foregoing drugs. Its antipyretic effect is slow and uncertain. It is often not well tolerated by the stomach. Alone it is not to be relied upon; but given in conjunction with quinia, it may add to the efficiency of the latter. Liebermeister advises it to be given in substances (in powder or pills), from 11 to 22 grains, in divided doses, within about 36 hours. This author considers its effect upon the heart, in cases of fever, to be the reverse of that in certain of the affections of this organ. According to him, its use is contraindicated by feebleness of the heart's action.

Veratria, which possesses considerable potency as an antipyretic, is objectionable on account of its being liable to occasion nausea, vomiting, and general depression. The mineral and vegetable acids have a mild refrigerating effect, and are thereby useful when the temperature is but slightly or moderately raised, and as adjuncts to the more efficient remedies when there is hyperpyrexia.

General diseases other than fevers, to be considered in this section, are an arthritic group of affections, namely, articular rheumatism, or rheumatic fever, gout, and rheumatoid arthritis. To these is to be added epidemic cholera.

THE DIAGNOSIS AND TREATMENT OF FEVERS.

I.

THE CONTINUED FEVERS.

SIMPLE CONTINUED FEVER. FEBRICULA. EPHEMERAL FEVER. TYPHOID FEVER. TYPHUS FEVER. RELAPSING FEVER. CEREBRO-SPINAL FEVER. DIPHTHERIA. ERYSIPELATOUS FEVER. PHARYNGEAL FEVER.

IN this division belong simple continued fever inclusive of febricula and ephemeral fever, typhoid and typhus fever; cerebro-spinal fever, (cerebro-spinal meningitis), diphtheritic fever (diphtheria), erysipelatous fever, and pharyngeal fever, are to be included among the continued, as distinguished from the periodical and the eruptive, fevers. All these fevers have a self-limited duration. It is logically certain that each, the first, perhaps, excepted, is caused by a separate special morbific agent. A distinctive fact relating to typhoid and typhus fever is, they extinguish the susceptibility to their special causes, so that, save in rare instances, they do not recur in the same subject. This does not hold true of the other continued fevers.

It is highly probable that the foregoing list does not embrace all the continued fevers which occur in this country. Cases are met with in which the fever is neither eruptive nor periodical, and which lack the diagnostic characters of each of the continued fevers which have been named. Further clinical studies may establish additional fevers belonging to this division. Cases attributable to sewer emanations or house poisoning, present characters of a distinct fever.

Collectively, the continued, are discriminated from the periodical and eruptive, fevers without difficulty. The absence of intermissions or remissions, and of the characteristic eruptions, suffices for the exclusion of the latter.

The fever known in the past history of epidemics as miliary fever or the sweating sickness, and which has prevailed in the past and present century, at times, in certain parts of Germany, France, and Italy, is characterized by peculiar traits, rendering it clear that it is to be considered as a distinct species. Up to the present time, for physicians in this country, it has only a historical interest, and for an account of it the reader is referred to other works.[1]

SIMPLE CONTINUED FEVER, FEBRICULA, EPHEMERAL FEVER.

A fever lasting but a single day, not belonging to the group of periodical fevers, is, literally, ephemeral. The following is an example: A child, six or seven years of age, while playing out of doors, apparently in perfect health, at noon time complained of illness, and was taken home. Soon afterward the axillary temperature was 104° F. There was no evidence of any local affection. No remedies were prescribed. At midnight the fever was diminished; after seven hours it was slight, and at noon the thermometer showed absence of fever. There was no return of the febrile condition, although no preventive treatment was employed, and the usual health was at once regained. This is a sketch of a case noted by the author. The diagnosis was based on the absence of any prodromic symptoms; the speedy occurrence of a considerable rise of temperature, and the absence of any local disorder. Neither typhus nor relapsing fever prevailed, so that these were excluded; there could have been no exposure to smallpox; the symptoms of scarlet fever and measles were wanting, and there was no suspicion of malaria.

---

[1] *Vide* Zuelzer in Ziemssen's Cyclopædia.

A febricula not literally ephemeral, continues for a few days without any of the characteristics of the other continued fevers. The absence of these characteristics is implied in the name simple continued fever. That a fever will prove to be of this kind cannot always be at once determined. The points which render the diagnosis probable are, the occurrence without prodromes, the rapid rise of temperature, and the absence of the local symptoms which distinguish the early part of the other continued fevers, namely, the abdominal symptoms in typhoid, the cerebral disturbance in typhus, and the arthritic pains in relapsing fever. Its occurrence after events which are supposed to be adequate for the causation, are to be taken into account, namely, exposure to heat, over-fatigue, and excesses in eating and drinking. In a certain proportion of cases, a fever of short duration is an abortive typhoid or typhus fever. It is not probable that all cases belong in this category. The diminutive term febricula, it should be added, has relation to the duration of the fever, rather than to its intensity. The fever in some cases is intense.

Simple continued fever in this climate is unattended by danger. It is otherwise in tropical climates. In fatal cases no characteristic lesions are found after death—a fact which shows, at least, that it is distinct from typhoid fever. The treatment consists in fulfilling symptomatic indications. Hyperpyrexia indicates antipyretic measures. Insomnia calls for hypnotics. Owing to the short duration, there is no urgent need of the sustaining treatment.

There is a liability to be misled by cases which end spontaneously within a few days, with reference to the efficacy of abortive measures of treatment. In drawing deductions as to the success of these measures, the number of cases must be large enough to allow some instances in which the fever may have ceased from an intrinsic tendency.

TYPHOID FEVER.

This fever in past medical literature has a great variety of names. Other names than typhoid fever, at the present day, are enteric and pythogenic fever, the former having reference to the characteristic intestinal lesions, and the latter to its supposed causative connection with *putrescent* matter. By German writers it is called abdominal typhus.

The name typhoid, although inappropriate, will probably continue in use.

From a clinical standpoint, typhoid fever may be defined an endemic disease, continuing usually from three to four weeks; very rarely ending under two weeks, and sometimes its duration extending to six or seven weeks; distinguished from the other continued fevers by a group of abdominal symptoms to which characteristic intestinal lesions stand in a causative relation; presenting, in a majority of cases, a peculiar eruption; occurring especially in the autumnal season; rarely affecting persons of over fifty years of age; communicable in some way from the sick to the well, and its causation generally dependent on a special morbific agent derived from human fecal excrement.

The following sketch will embrace the salient points in the clinical history of typical cases:—

The commencement of the disease is often not easily determined with precision. The first manifestations are slight, and they gradually increase, the patient taking to the bed after a period varying from four to ten days (prodromic period, forming stage or access). The symptoms prior to taking to the bed are, cephalalgia, anorexia, nausea, chilly sensations, tendency to looseness of the bowels, progressively increasing weakness, general malaise, and, in a large proportion of cases, epistaxis. During the first week after confinement to the bed, the patient complains chiefly of headache, sleeplessness, and lassitude. The bowels are loose, or diarrhœa is more or less prominent, and the stools have an ochre or yellowish color. The abdomen is enlarged, and yields a tympanitic resonance on percussion. There is tenderness on pressure in the iliac regions, and especially on the right side. This tenderness may be more or less diffused, and gurgling is often heard on pressure. Percussion shows enlargement of the spleen. The face is moderately congested. The pulse is increased in frequency from 100 to 120 per minute. The temperature of the body rises gradually, becoming at the end of the week 103° or 104° in the evening, and from one to two degrees lower in the morning. With this collection of symptoms following those of the access or forming stage, there need be little doubt as to the diagnosis.

At the beginning of the second week the eruption is apparent. The eruption consists of soft, slightly elevated, rose-colored, slightly oval papules, the redness momentarily disappearing on pressure. It is apparent on the trunk in front and behind. The papules are sometimes few and sometimes numerous. New ones appear every second or third day, and those which have appeared disappear. The eruption sometimes extends to the extremities. The patient ceases to complain of headache, or to make any complaint. The countenance is indicative of indifference or of stupidity. The patient lies in apparently a somnolent state, but is easily aroused, relapsing again into somnolency (coma vigil). Delirium is manifested by incoherent muttering, especially at night, and by efforts to get out of bed, a desire to go home being the reason often given. The pupils are generally dilated. The abdominal symptoms continue, and are more marked than during the first week. The tongue is in most cases coated and dry. It is often protruded slowly, and, when protruded, the patient does not withdraw it until requested. Not infrequently its surface presents fissures or cracks, and the edges are reddened. Sordes is apt to collect on the teeth, and, if not removed, on the lips. The pulse is more frequent than in the first week. The axillary evening temperature varies from 104° to 105°, with slight morning remissions.

The symptoms of the second, continue during the third and fourth week, or, if the disease be protracted, up to the end of the febrile career. The rose-colored papules come and go during the whole course of the fever, or, at least, for a period of from thirty to forty days. The countenance has the same expression, or it is expressionless. The passive delirium is increased. The abdominal symptoms remain, varying considerably in different cases. The fecal evacuations are passed in bed, not generally from paralysis of the sphincter, but from indifference. This is true also of the passage of urine. Retention of the urine may take place, although there is constant dribbling. The urine may contain a trace of albumen. Coatings on the tongue may be thrown off, leaving the surface smooth and reddened. Coma vigil is more marked. Subsultus tendinum, pulling up of the bedclothes, and picking at invisible objects in the air (carphologia) are frequent symptoms. The perceptions are blunted, so that flies may creep over the face without occasioning apparent annoyance. The patient asks for nothing; and, when not attempting to get out of bed, lies on the back without exhibiting any desire for change of position. The frequency of the pulse is in proportion to the gravity of the case. It is quick, compressible, and sometimes to the touch dicrotic. Perspirations not infrequently occur, followed usually by diminished frequency of the pulse. The temperature remains stationary, or is increased, with small morning and evening fluctuations.

Approaching convalescence is to be inferred from a decrease of the morning temperature, although for several days the evening exacerbation shows no diminution. The thermometer may show in the morning a decline to the normal range, and at evening a rise to 104° or 105°. The pulse becomes less frequent. There is less delirium, and, in place of coma vigil, the patient has natural sleep. Subsultus tendinum ceases. The skin is cool and supple. The tongue becomes moist, and the coating, if present, is gradually shed, leaving the surface natural in appearance. The diarrhœa, tympanites, and tenderness over the abdomen diminish. Defervescence, and the improvement in symptoms other than temperature, in most cases are gradual, but sometimes sudden, without, however, an observance of so-called critical days. The convalescence is in some instances preceded by profuse perspiration.

Convalescence is declared by the cessation of fever-heat, reduction of the frequency of the pulse to near the normal standard, desire for food, refreshing sleep, and recovery of the mental faculties. The temperature sometimes falls temporarily below the normal average, and this is true also of the pulse.

This picture of the disease does not represent some mild cases in which there is but a moderate rise of temperature, the pulse but little increased in frequency, the abdominal symptoms slight, and the mental faculties slightly or not at all disturbed. The disease sometimes has so little intensity that the patients do not take to the bed. These are known as "walking cases." The abdominal symptoms not only may be slight, but they are sometimes wanting, although the intensity of the fever is considerable. The eruption is not always present; it may be absent in severe, and present in mild, cases, its presence or absence, sparseness or abundance, having no significance as regards the severity of the disease. Not infrequently the eruption is slight, consisting only of four or five papules. The duration of the disease does not depend on its mildness or severity; mild cases may be protracted, and severe cases may have a short career or spontaneously abort.

The course of typhoid fever is liable to manifold diversities arising from complications, intercurrent events, and accidents. The more important of these are the following: Pneumonia (lobar) is a not infrequent complication. The lancinating pain and characteristic sputa are rarely manifest. The occurrence of the complication should be suspected from increased frequency of the respirations, and dilatation of the alæ nasi. The physical signs demonstrate its existence. The danger is much increased by this complication, but it by no means warrants a fatal prognosis. Embolic pneumonia, sometimes leading to circumscribed gangrene, is a very rare complication. Pleurisy with effusion and empyema are far less frequent than lobar pneumonia, Bronchitis is common, but rarely extensive enough to occasion disturbance of respiration. Laryngitis giving rise to œdema of the glottis, and the latter without the former, are extremely rare complications in this country. They appear to be not very infrequent in Germany and France. The only instance of œdema requiring tracheotomy, which has fallen under the author's observation, was in a Parisian hospital.

Acute diffuse peritonitis is a most important complication, proving fatal in the vast majority of cases. In most instances it is due to intestinal perforation, and, with this causation, the probability of recovery is almost *nil.* When caused by the separation of a slough from a mesenteric gland, there are more chances of recovery. Liebermeister mentions as a physical sign of the presence of gas in the peritoneal cavity, a tympanitic resonance over the liver. Much reliance, however, should not be placed on this sign, for, in addition to the liability of a portion of intestine to be situated over the liver, a tympanitic resonance from the colon below is not infrequently conducted so as to meet the pulmonary resonance. Peritonitis from either of the two cases named, does not occur prior to the third or fourth week of the disease.

Suppurative inflammation. of one or both of the parotid glands, increases the danger and prolongs convalescence. This rather infrequent complication may occur at any period, but generally not before the second or third week. Sometimes, but very rarely, instead of parotiditis, the submaxillary gland is the seat of suppurative inflammation.

Intestinal hemorrhage, if profuse, is to be reckoned among the grave accidents incident to typhoid fever. It involves danger of death from the loss of blood. It is, however, to be borne in mind that recovery takes place, in the majority of cases, even when the hemorrhage is profuse. In two cases under the author's observation, the loss of blood occasioned prolonged syncope, or a state of collapse, from which the patients rallied, and the disease ended in recovery. A sudden fall of temperature within or below the normal range, after the third week of the disease, should be considered as probably denoting the occurrence of hemorrhage, before the evacuation of blood. In a case seen by the author, when such a fall had just occurred, it was regarded as evidence that the course of the disease had suddenly ended. Within a few hours, however, blood was passed from the bowels in large quantities, and death from syncope was the result. In another case, the occurrence of hemorrhage was correctly diagnosticated by a fall of temperature not otherwise explicable. Nasal hemorrhage is sometimes so persistent and profuse as to involve danger. Generally this occurs in the latter part of the febrile career, and in young subjects. Plugging of the anterior, and, if this do not suffice, of the posterior, nares, is indicated if the loss of blood be considerable.

Active or maniacal delirium is an occasional event. In the author's experience, this has proved a fatal omen. Patients, if left alone, are liable to get out of bed, and may throw themselves from a window, under a transient delusion, when active delirium does not exist. In a case under the author's observation, the patient let himself fall from the window of the second story, falling on a brick pavement, receiving no important injury, and the case ended in recovery.

The author has observed hysterical delirium and insanity during the stage of convalescence. Hysterical convulsions in one case was attended by a considerable rise of temperature, which occasioned alarm lest an important sequel had occurred. The temperature, however, in a short time declined, and the convalescence progressed without other incidents of importance. In a case of insanity with the pleasing delusion that the patient, a poor young man, had come into possession of great wealth, the mental aberration lasted but a few days, and restoration to health took place without untoward circumstance. In another case, the insanity was characterized by hallucinations and delusions analogous to those of delirium tremens, and the patient, a young girl, attempted to throw herself from the window. In this case the insanity lasted but a short time, the mental faculties being perfectly restored.

Coma, developed suddenly or gradually, is an exceedingly grave event. It may take place at any period of the disease. In the author's experience, it has been a fatal omen. It has happened that within a few hours of the present moment, the author has seen a private patient, a young girl, who had gradually lapsed into complete coma on the fourth day after taking to the bed. The author has called attention to a premonitory symptom of sudden coma in this disease, namely, a disturbance of the rhythm of respiration, consisting of a shortened and quickened, or spasmodic, inspiration. When this symptom is observed, and not explained by the occurrence of any pulmonary complication, coma may be predicted, although there be nothing else to denote that it is about to occur. The coma is, in some instances, uræmic, dependent on renal disease either existing antecedently to the fever, or developed during the coma of the latter. This, however, is not the pathological explanation in all cases. Convulsions, which usually accompany uræmic coma, are rare in connection with the coma in typhoid fever.

Thrombosis of the iliac or femoral vein is among the rare events or accidents occurring in the latter part of the disease, and giving rise to ocal appearances familiar under the incorrect name phlegmasia dolens. or anatomical reasons this happens much oftener on the left than the ight side. It occasionally occurs on both sides. The occurrence of mbolism of the pulmonary artery from detached portions of the thromosis is rare, and recovery from the local effects of the venous obstrucion is the rule.

Eruptions other than the rose papules sometimes are observed during he course of the disease. Sudamina or miliary vesicles are not rare. ccasionally there are true petechiæ, that is, minute ecchymoses. A are event is the occurrence of blue patches several inches in diameter taches bleuatres). Neither of these has any special significance, or imortance as regards severity of the disease.

A relapse of the disease during convalescence is not very uncommon. t occurs oftener than a second attack subsequently. After two or three veeks from the date of the end of the fever, it returns, and the patient asses through a second career with the abdominal symptoms, the erupion, etc. As a rule, the relapse is mild, and ends in recovery. This ecurrence of the disease is not attributable to exposure, fatigue, imprulence of diet, etc. It is due to the renewed action of the special cause, vhatever this may be, and the supposition that a new infection from withut takes place, is, in some cases at least, vastly improbable.

The diagnosis of typhoid fever, in most cases, is not a difficult probem. It is easily discriminated from other essential fevers, if it be ncomplicated, and its diagnostic characters be present. The more imortant of the latter are the duration of the forming stage, the gradual ncrease of temperature during the first week, epistaxis, the abdominal ymptoms, and the characteristic eruption. All these are, however, not nvariably present. The abdominal symptoms and the eruption may be bsent. The diagnosis must then rest in no inconsiderable degree on he exclusion of other fevers. Typhus is excluded by the absence of its iagnostic characters, which will be stated when this fever is considered. erebro-spinal meningitis, diphtheria, and erysipelatous fever, each has ts distinctive features which are readily ascertained, and their absence uffices for its exclusion. It is, of course, only when these fevers are revailing that there is occasion for the differential diagnosis. A purely emittent fever is easily excluded; but a typho-malarial fever not as asily. By the latter term is to be understood, not a remittent fever vith symptoms denoting a typhoid state, but a form of disease in which yphoid fever and malarial fever are blended. This affection will be onsidered separately, after the consideration of the periodical fevers. Vithin a few days, if not at the outset, the several eruptive fevers can ardly be confounded with typhoid fever. The latter, however, may coxist with either of the former. The fact of the blending is to be deternined by the combined diagnostic characters of the two diseases which re blended.

Certain other affections which may simulate, in a measure, typhoid ever, are to be excluded. Pneumonia (pneumonic fever) not infreuently is associated with the symptoms which constitute the typhoid ondition (low delirium, subsultus tendinum, adynamia). In a case of doubt, the problem is, whether the pneumonia be the primary affection or a complication of the typhoid fever. This is generally solved by reference to the early history of the case. If the pneumonia be a complication, the history will show that the fever preceded the local affection, and *vice versa*. The abdominal symptoms and the eruption, if present, settle the question. It is only when these are absent, typhoid fever nevertheless existing, that there is any real difficulty of diagnosis.

Cerebral meningitis, acute mania, and acute miliary tuberculosis are each sometimes confounded with typhoid fever. Close observation should seldom, if ever, fail to prevent this error.

In cerebral meningitis there is generally notable intolerance of light and sounds; vomiting is an early symptom, and usually more or less prominent; the temperature is more variable than in typhoid fever; somnolence, and coma occur sooner after the date of the attack; the abdomen is collapsed, and the bowels constipated.

Acute mania is not a febrile affection, and maniacal delirium in the early period of typhoid fever is rare. This error, although sometimes committed, is hardly excusable when the thermometer alone would suffice for the exclusion of acute mania as a form of insanity.

Acute miliary tuberculosis may simulate typhoid fever as regards pyrexia and the general aspect. But the frequency of the respirations is out of proportion to the pyrexia; there is often cyanosis; cough and expectoration are more or less prominent, with, perhaps, hæmoptysis, and physical exploration of the chest, while it excludes pneumonia, is likely to reveal subcrepitant râles, with broncho-vesicular respiration and increased vocal resonance localized in different situations on both sides.

Pyæmia and septicæmia simulate typhoid fever; but, in most cases, the fever in these affections is connected with local causes which are apparent, or with puerperal conditions. The intensity of the fever is greater at the outset than in typhoid fever. The rigors and perspirations which enter into their history are distinctive features.

Repeating what has been already stated, it is only when the strongly marked diagnostic characters of typhod fever, namely, the abdominal symptoms and the eruption, are absent, that there is room for doubt in the differentiation from other affections. The difficulty in diagnosticating the disease in children is more apparent than real. It is true that in children the eruption is oftener wanting than in adults. And in children simple enteritis is more frequent than in adults. Moreover, it is not as easy to judge of mental aberration in children. But the apparent difficulty consists mainly in this: typhoid fever in children has been called infantile remittent fever. Now, in cases of infantile remittent fever, if the disease be an essential fever, and malaria be excluded, the disease is in reality typhoid fever. Substituting the latter name for the former, the difficulty in diagnosis is small.

The cases involving the most real difficulty are those in which the disease is a continued fever, without the symptomatic characteristics of typhoid, and, yet, the other recognized essential fevers can be excluded. Such cases occur not infrequently in the city of New York, and are attributable to local causes connected with sewer emanations. As already intimated, it is highly probable that these are actually cases of one or more species of fever distinct from typhoid. That the existence of fevers not now included in the nosology will hereafter be added, may be predicted with much confidence.

Prevention of Typhoid Fever.

The knowledge already acquired of the causation of typhoid fever warrants the assertion that it is a preventable disease.

That the disease is communicable by means of drinking water polluted by dejections from typhoid patients has been demonstrated. Perhaps the most complete demonstration which can be referred to, is afforded by the outbreak of this fever in North Boston, New York, many years ago. This was before attention had been directed to water as the medium for the conveyance of the special cause, and, at the time, this method of infection was not suspected. It has been recently ascertained that the well used in common by the families in which cases occurred, and by these only, was in close proximity to the privy, and that the latter was in a bad condition.[1]

That the disease may be caused by breathing air containing effluvia from decomposing human fecal excrement is not less certain. In this way the causation of the disease in the city of New York is to be explained, the water-supply being from a river fifty miles distant. If the water distributed contain fecal matter, it must be in an infinitesimal quantity. It is vastly probable, if not certain, that effluvia from excrement not containing typhoid dejections may cause the disease. Facts observed within late years in London have shown that the special cause may be contained in milk, being derived from the water used either for dilution or in cleansing milk cans. The communication of the disease, by means of the breath or emanations from the surface of the body, to other patients in hospital wards, or to the attendants on the sick in private families, if it be possible, is so rare that there is no necessity for isolation on that account.

The foregoing statements point to the measures for prevention. The dejections from patients should be at once disinfected. Carbolic acid, in the proportion of one part to forty parts of water, may be used for that purpose. If the odor of this disinfective agent be objectionable, the sulphate of iron is a good substitute. The latter has the advantage of cheapness over such preparations as Burnett's or Condy's fluid and chloralum. Of a saturated solution of the sulphate of iron, half a pint or more should be poured upon each dejection. Or the sulphate of iron and carbolic acid may be combined in the following proportions: Four pounds of the iron and four ounces of the acid to two and a half gallons of water. In the country it is a good precaution to bury the typhoid dejections under ground by themselves, not throwing them into the privy in common use, the object being to prevent any contamination of the atmosphere. The spots selected for their deposit should be situated where by no possibility they can pollute drinking water. Clothing and any articles soiled by the dejections should be disinfected by carbolic acid water, or boiled.

---

[1] For a condensed account, *vide* Principles and Practice of Medicine, by the author. For facts relating to the well, *vide* Transactions of the American Public Health Association, vol. i.

Security of drinking water against fecal pollution is of special importance. Privies should be so situated, in relation to the wells, springs, or streams from which water is obtained, that no percolation from the former to the latter can possibly take place. The water-supply in towns should be from sources with which sewerage is not commingled. This is of the utmost importance. The appearance and taste, it is to be borne in mind, may give no evidence of pollution; water containing the special cause of this disease may seem to be remarkably pure and agreeable. If on testing it be found free from organic matter, it is probably innocuous: but the fact that only a small quantity of this matter be found on analysis affords no security, for it is not the amount, but the kind, of impurity which, in this connection, is of importance. Although nearly pure, as determined by chemical tests, it may contain the special cause of this disease; and, if extremely impure, this special cause may not be present. With our present knowledge, it is impossible to demonstrate either the presence or the absence of typhoid germs. Considering the difficulties connected with securing absolute purity of drinking water in towns, it is a question whether sanitary precaution does not require provisions for the supply of distilled water to those who desire the most complete protection against the introduction by this medium of morbific agents. It is probable that boiling water destroys the typhoid fever germs.

To prevent the contamination of the atmosphere by fecal effluvia is a measure of prevention, perhaps, not less important than the measures relating to water. This effluvia comes from sewers, drains, cesspools, and, within houses, from soil-pipes or the wash-basins, bath-tubs, sinks, and water-closets therewith connected. Constant observation to see that the waste-pipes do not allow escape of gas, their proper ventilation, traps, connected with every outlet, which cannot be "siphoned out," and care that the water in traps is not exhausted by evaporation, are requisite in order to prevent against danger. With ever so much vigilance, it is difficult to avoid all risk. The so-called "modern improvements" in dwellings have been productive of much disease and fatality. The only perfectly safe course is to dispense with them altogether, especially in sleeping rooms. It is safe to say that thousands of houses of the first class in the city of New York, as doubtless in other cities, are more or less insufficiently protected against sewer emanations. If persons desire security in this regard, wash-basins, bath-tubs, sinks, and water-closets should be in an extension building completely disconnected from the dwelling-house. This precaution, whenever practicable, cannot be too strongly advised.

With reference to preventive measures, a single case of typhoid fever should always be regarded as proof that there is a sanitary fault somewhere, which should be diligently sought after until discovered. In this way other cases may be prevented. Typhoid fever, wherever it prevails, may be "stamped out" by thorough investigations as to its sources, and preventive measures based on the discovery of its causation. It is perhaps not too much to say that the extinction of this disease is within the reach of sanitary science.

Treatment of Typhoid Fever.

At the present moment it cannot be said that clinical experience has established the reliability of any measures for the arrest of typhoid fever. Using language in accordance with the prevailing theory of the causation, there is no known parasiticide as effective in this disease as is quinia in the destruction of malarial germs. Blood-letting, as formerly practised at the outset, were it sometimes successful as an abortive measure, would be unwarrantable on the ground that, failing to arrest the disease, it might impair the chances of recovery. Quinia fails to arrest the disease, at least given in doses which can be employed with safety. Currie affirmed, after a large experience extending over many years, that most cases of continued fever might be cut short by the cold affusion. Quoting his language, "Used in the three first days of fever, the cold affusion very generally stops the disease; the same happy effect sometimes follows its use on the fourth or even fifth day, but seldom later."[1] This statement, based on many hundred cases, can be gainsaid only by supposing that Currie either was self-deceived or undertook to deceive others, and both suppositions are incredible. It is therefore an important question whether Currie's method (*vide* page 674) should not be revived as an abortive measure in this fever and in other essential fevers.

Curative Treatment.

Currie claimed for his method of treatment that, if the disease be not arrested, "when the heat continues preternaturally great, and the skin dry, it is of great and manifest advantage, almost immediately relieving the most distressing symptoms, particularly restlessness and delirium, and conducting the disease to a safe and speedier issue." It is to be borne in mind that, in order to carry out Currie's method properly, the cold affusion must be repeated whenever the temperature rises much above the normal standard, as determined by the thermometer, even if the intervals be but one or two hours. He anticipated Wunderlich in the employment of a clinical thermometer, and he devised a form which was easily inserted in the axilla. He regarded a sense of chilliness and perspiration as always contraindicating the cold affusion. Currie also employed tepid affusions, regarding them as "possessing very considerable but inferior efficacy." He was of the opinion that "in some cases, the heat is lowered more speedily by the tepid water." Sponging of the body with cold or tepid water, he regarded as having considerable efficacy, and the free use of water internally entered into his treatment of fevers.

Of the curative treatment, lessening preternatural heat is probably, with our present knowledge, the most important object. Antipyretic measures (*vide* page 674) are to be employed according to the indications in individual cases. The employment of the several hydropathic methods for the first time, should, if practicable, be under the observation of the physician, in order that he may give proper directions for their subsequent use. The effect on the circulation should be especially observed, as the risk of harm is chiefly in that direction. Notable feebleness of the heart's action and cyanosis call for stimulants and discontinuance of the application of cold. Systematic and complete antipyretic treatment, it is to be borne in mind, requires that the hyperpyrexia should be reduced as often as it recurs. If this be not accomplished, the treatment is inefficiently carried out. The treatment embraces not only the application of cold, but the use of quinine and other remedies mentioned in the chapter introductory to this section (*vide* page 675).

---

[1] Medical Reports on the Effects of Water, Cold and Warm, as a Remedy in Fever and other Diseases, by James Currie, M.D., F.R.S. Am. Edition. Philadelphia, 1808. This work well repays perusal at this day.

The author's observations as regards the antipyretic treatment, are sufficient to lead him to believe the statement by Liebermeister, that, under this treatment, "the old picture of a typhoid fever patient is no longer to be seen," to have a solid foundation in clinical experience, although somewhat extravagant; and to concur with this writer in saying that thereby "typhoid fever has lost a great part of its terrors."

There are other curative agencies in this disease. The more important of these are the mineral acids, namely, the hydrochloric, phosphoric, and sulphuric. Each of them, sufficiently diluted, and flavored with the syrup of lemon or orange peel, makes an agreeable drink, and may be given as such. From six to eight drachms of the dilute phosphoric, and from three to four drachms of the dilute sulphuric or hydrochloric acid, in a pint of water, may be taken in the twenty-four hours. Clinical experience has shown that by the use of these acids the severity of the disease is lessened, and the rate of mortality diminished. In these respects they are curative, although the duration of the disease may not be abridged. They should enter always into the treatment, inasmuch as they in nowise conflict with other therapeutic measures. Which one of the different acids named is to be preferred, it is not easy to say. Each has abundant testimony in its favor. In the author's experience, the dilute sulphuric has been the one generally used.

Emetics were formerly given in the early part of typhoid fever. They have fallen into disuse, although the late James Jackson was led by the analytical study of a large number of cases, to the conclusion that they shortened the duration and diminished the fatality of the disease. Cathartics also, which, as an element of the antiphlogistic treatment, were considered indispensable until within late years, are now rarely given. Calomel, which heretofore formed a part of the treatment in all febrile and inflammatory affections, is rarely prescribed at the present time. Liebermeister, however, cites statistics to show that from eight to ten grains daily for the first few days reduces the death-rate from typhoid fever. He also adduces statistical data in proof that the iodide of potassium, either alone or combined with iodine, has the same effect. If given alone, from a scruple to a drachm of the iodide is to taken in the twenty-four hours. If given with iodine, one part may be combined with two parts of the iodide of potassium and ten parts of water, and three or four drops administered every two hours. The author is not sure that the latter treatment has been tried in this country. Murchison and others have found it to have apparently no influence upon the disease. On theoretical grounds, as antiseptic remedies, carbolic acid, creasote, and the sulphites have been tried, but without results showing a curative influence. Salicin has been found advantageous by Prof. Ercolani.[1] From the notable efficacy of this remedy in rheumatic fever, and its value in relation to digestion, a further trial of it in typhoid fever is desirable.

Palliative Treatment.

The successful palliation of certain symptoms may do not a little toward contributing to the favorable termination of the disease. This remark applies especially to sleeplessness and delirium. These induce exhaustion, and thereby increase the danger of dying by asthenia. The anti-pyretic treatment prevents and relieves these symptoms, and in this effect consists, in part, its salutary influence. If it fail to have this effect, or if the intensity of the fever be not sufficient to call for it, measures having special reference to these symptoms are indicated. The wet pack (*vide* page 675) is a measure of much potency in tranquillizing the nervous system and inducing sleep; and the induction of sleep is prophylactic as regards delirium, the latter being in a great measure a consequence of sleeplessness. Opiates have sometimes a happy effect. Codeia, from its hypnotic property, is an eligible form of opiate. The bromides may be tried, and the hydrate of chloral, prescribed with proper caution, is often useful. When delirium is a prominent symptom, the tartrate of antimony and opium, as recommended by Graves, the quantity of the former not being sufficient to cause vomiting, is an effective combination.

Cephalalgia in the early part of the disease is most effectually relieved by the cold douche and the ice-cap. And in order to render these measures more efficient, and promote coolness of the head, the hair should be closely cut as soon as it is evident that the patient must pass through the febrile career.

Diarrhœa, if the number of dejections exceed two or three per diem, is to be restrained by opium, to which some one of the vegetable astringents—tannin, rhatany, kino, etc.—may be added. The chalk mixture is a good vehicle for the administration of these. Turpentine, in doses of eight or ten drops every two or three hours, has a favorable effect upon the intestinal affection. Turpentine stupes applied over the abdomen are useful.

Tympanites, if sufficient to produce uneasiness and interfere with the movements of the diaphragm, is to be relieved by turpentine, internally and externally, powdered charcoal, and the introduction into the colon of a rectal tube. The application of ice to the abdomen for the relief of this symptom has been recommended.

For the symptoms, which writers formerly distinguished as ataxic, namely, subsultus tendinum, carphologia, and picking at the bedclothes, musk is a remedy perhaps not sufficiently appreciated at the present day, given in doses of ten grains every two hours.

---

[1] Epitome of Therapeutics. By W. D. Stone, M.D. London, 1874.

Sustaining Treatment.

The importance of supporting the vital powers and "obviating the tendency to death," can hardly be over-estimated when it is considered that, provided the patient can be kept alive for a certain period, the disease will end; and, however grave may have been the symptoms, if there be no serious complications, the patient will recover. A case may present on one day the evidences of impending death by asthenia; on the following day the fever may have ceased, and convalescence becomes speedily declared. Under these circumstances there is reason to believe that lives which would otherwise have been lost, are saved by efficient support. A case of fever, let the condition of the patient appear never so desperate, should not be abandoned as hopeless. In the author's experience, a patient with typhoid fever, in a public institution, was seemingly so near a moribund state, that, on the following day, the visit was made with an expectation of a post-mortem examination to which some medical friends were invited. The patient was found free from fever, and rapidly convalesced.

The sustaining treatment consists chiefly of alimentation and the use of alcoholics.

Alimentation is an important part of the treatment in all fevers, and other diseases which tend to destroy life by asthenia. It is especially important in cases of typhoid fever, owing to the duration of this disease; and the importance, of course, increases, the longer the disease continues. Milk and eggs should form the basis of a fever diet. These should be supplemented with meat broths and some farinaceous food. The prepared extracts of meat, such as Liebig's and Valentin's, it is to be understood, carry into the system very little nutritive material; they are stimulants rather than alimentary articles of diet. Well-made broths are to be preferred to any of the preparations which are sold under the names meat solution, fluid beef, etc. The importance of alimentation is too great for reliance to be placed on these. Broths of beef, mutton, and fowl may be made highly nutritious, as well as palatable, by long boiling, concentration by evaporation, and the addition of the albumen of egg, together with various farinaceous articles—barley, rice, etc.

The following are important practical precepts relating to the dietetic management: As much food is to be given as can be assimilated. There is no danger of over-assimilation, but it is useless, and may prove hurtful, to introduce more food than can be appropriated. The quantity of food which can be taken with advantage is to be determined by observations in each case. If food taken be not vomited, and if there be no symptoms, denoting either indigestion or disturbance of the alimentary canal, which are fairly attributable to the ingesta, it may be inferred that the quantity is not too large. It is better to err in giving more food than is digested, than to give less than is required. Death may be attributable to inanition or starvation in cases of fever, and, also, other diseases which kill by asthenia.

The physician should be explicit in his instructions as to the kinds of food to be given, the quantity, and the intervals. General directions are not sufficient; there is risk, if not a probability, that the patient will be either over-fed or under-fed, and that important points concerning the preparation and variation of articles of diet will not be observed. As a rule, food should not be given oftener than once every two hours. Much harm is sometimes done by following a general direction to give as much food as possible, and feeding the patient every few minutes. A definite quantity, as directed, of a certain kind of food should always be given, if practicable, at a specified time. Milk should alternate with a meat broth. Both should be varied on each successive day, unless the patient manifest a preference for a particular mode of preparation, the object being to avoid the invincible disgust which is generally produced by giving the same kind of food continuously. Milk may be varied by giving it either raw or boiled, warm or cold, frozen or coagulated by rennet. Some patients take readily buttermilk in preference to milk. Generally, to milk in a fluid form lime-water should be added in the proportion of one-sixth or one-eighth part. Coffee and tea are good accompaniments in some cases, milk forming the larger part. The albumen or yolk of egg, either or both, may also be given in tea and coffee. These are often useful aside from being a means of rendering the accompanying nutriment acceptable. Broths may be made of different kinds of meat on different days, and may be varied by flavoring differently. The juice of meat may be given hot, cold, frozen, or in the form of jelly. Oyster or clam-broth is sometimes taken without repugnance, and may be made nutritive by the addition of milk. A record should be made always at the time food is given, to be submitted to the physician at each of his visits. He should not be satisfied with general statements in regard thereto. On this record and his observation of symptoms he is to base his further dietetic instructions.

Food is to be given in cases of typhoid fever without any desire for it on the part of the patient, and in spite of a reluctance to take it. The blunted mental perceptions prevent an appreciation of the wants of the system as expressed by hunger, and the reluctance proceeds, in a great measure, from an indisposition to any exertion. Under these circumstances, the judgment of the physician must take the place of the instincts of the patient. Any preference, however, which the patient may manifest for particular kinds of food should be heeded; and it is highly desirable to avoid causing a feeling of disgust for the articles given.

Under the name alcoholics, here, as heretofore, are embraced spirits, wine, and malt liquors. The two former are generally to be preferred in cases of typhoid fever. Alcoholics are not needed in every case. Their moderate use suffices in many cases They are probably far less required in proportion as the intensity of fever is lessened by antipyretic treatment. But they are essential in some cases; and lives may be saved by their use which would otherwise be lost. The latter statement is based on the author's clinical observations extending backward to more than a quarter of a century.[1] The term alcoholics is used instead of alcoholic stimulants, because, in fulfilling the indications for sustaining treatment, the effect is not stimulating, but, as regards the circulation and nervous system, rather sedative: the frequency of the heart's action is lessened and the cerebral disturbance diminished. Alcoholic excitation should never be produced when alcoholics are given with the object of sustaining the vital powers. This may be laid down as a fundamental precept.

---

[1] *Vide* Clinical Reports on Continued Fever, 1852.

The indication for alcoholics is derived from symptoms which represent especially the vital powers, or, in other words, symptoms denoting asthenia. The symptoms which have most significance, in this point of view, relate to the pulse and the first sound of the heart as heard by auscultation over the apex. Weakness of the heart's action is the objective point in the alcoholic treatment. Frequency, softness, and compressibility of the pulse denote cardiac weakness, and constitute an indication for alcoholics. Feebleness of the first sound of the heart over the apex is a criterion equally available and even more reliable. Alcoholics are indicated in proportion to the degree of cardiac weakness as thus represented. It is impossible to lay down rules of general application as to the use of alcoholics. In regard to commencing their use, it is far better to begin too early than too late. Given before they are needed, they certainly cannot do much, if any, harm, assuming that the quantity given is not large, and, if the effect be not good, their use can be suspended; on the other hand, unduly delayed, the time lost cannot be regained, and the life of the patient may be the penalty of the delay. Their tentative use is to be the guide in cases of doubt. Whenever, in the mind of the physician, it be a question whether they are indicated, the proper course is to give a certain quantity, say an ounce of some kind of spirit, or an equivalent quantity of wine. In two or three hours the effect on the pulse, the nervous system, and the general condition can be observed. The result of this observation is to determine the continuance or discontinuance. In like manner, the quantity indicated is to be determined by observation. In this connection an important fact is to be mentioned, namely, the disease generally involves an increased tolerance of alcohol, as compared with health. This increased tolerance is by no means uniform in all cases, and it can only be determined by observing the effect in each case. There can be no general rule as to quantity. An enormous quantity is tolerated and required in some cases. In other cases a moderate quantity suffices. Following the plan of experimental observation which has been just stated, with due attention the physician cannot be led astray. The simple question, to be answered by the result of trial, is, what amount causes no alcoholic excitation, but is followed by improvement as regards the pulse, the first sound of the heart, the cerebral symptoms, and the general condition. The importance of allowing a sufficient interval between each time of giving alcoholics to observe the effect, is obvious.

The choice among the alcoholics is to be determined by circumstances in individual cases. If the patient have been accustomed to their use, the kind which has been commonly used is to be preferred. When they are indicated in moderate quantity, good sherry wine is an eligible article. It is best given in the form of wine whey. Spirits are preferable if support be urgently indicated. It is better to give them simply diluted with water than in the form of milk-punch or egg-nog, lest the patient may acquire a disgust for the latter if the spirit used become repulsive.

Whenever the kind of spirit used is rendered repulsive by its continued use, another kind should be substituted. The advantage of variations in articles of diet alike pertains to changes in the kind of alcoholics.

The times when alcoholics are given and the quantity at each time are to be noted, so that the physician may be thereby guided in his instructions as to their continuance. As the case approaches convalescence, the quantity which has been tolerated without any alcoholic intoxication may produce this effect. Of course, the quantity is then to be diminished and their use discontinued when the indication therefor no longer exists.

The propriety of giving the carbonate of ammonia in typhoid fever is doubtful on rational grounds, the blood being already in a state of superalkalinity. Clinical experience shows that this remedy is apt to cause enteric irritation. The ethers have no real advantage over alcohol, and are not as easily administered. As remedies entering into the supporting treatment, camphor and musk should not in any degree take the place of alcoholics. Their liability to disturb the stomach renders them objectionable, at a time when the safety of the patient may depend on the ability of this organ to tolerate food and alcohol.

Treatment of Complications and Incidental Events.

Typhoid fever complicated with pneumonia, or, in more appropriate language, associated with pneumonic fever, does not thereby acquire any special indications for treatment. The blending of the two fevers renders supporting measures more important, and a new source of danger is added, namely, over-distension of the right side of the heart, involving liability to paralysis of the organ or the formation of heart thrombus. The liability to these accidents makes it desirable to sustain the power of the heart's action as much as possible, and, probably, alcohol is the most efficient agent for this purpose.

Intestinal hemorrhage is to be treated by absolute quietude, cold applications to the abdomen, and opium in doses sufficient to arrest peristaltic movements. The importance of avoiding risk of exciting vomiting renders the propriety of giving tannic acid and other vegetable astringents, or the astringent preparations of iron, doubtful. Moreover, their efficacy admits of doubt. Ergotine may be administered hypodermically, as advised by Murchison, as follows: From three to five grains dissolved in ten minims of distilled water injected beneath the skin.

Peritonitis is to be treated on the same principles as when it occurs irrespective of a connection with typhoid fever, the main reliance being on opium and efficient alcoholic support (*vide* page 298).

Œdema of the glottis calls for the timely performance of tracheotomy. This operation, in repeated instances which have been reported, has been the means of saving life.

If thrombosis of the iliac or femoral vein take place, the limb or limbs should be carefully bandaged, and complete rest is to be maintained in order to avoid risk of a detachment of the thrombus forming an embolus, and obstructing the pulmonic artery or its branches.

In cases complicated with parotiditis, suppuration is to be promoted by emollient applications, and an opening made as soon as fluctuation is ascertained.

Coma, whether sudden or gradual, should direct attention to the inquiry whether it be dependent on uræmia. If there be reason to suspect this connection, the endeavor to eliminate the urea by the skin is indicated. The hot-air bath is best suited for this purpose. Vesication of the back of the neck, or of the shaven scalp, should be resorted to. The cold douche applied to the head may be tried. Undue somnolency is sometimes notably relieved by strong coffee or tea.

Retention of urine should be promptly relieved by the use of the catheter.

Hygienic Treatment.

The success in treating cases of typhoid fever, depends very much on the faithful carrying out of hygienic measures.

The first thing to be done is to ascertain if the patient be not exposed to the continued action of the special cause of the disease. This involves a proper sanitary inspection of the house and its surroundings. Let it be a maxim that a case of typhoid fever is evidence of some defect pertaining either to stationary wash-basins, bath-tubs, waste-pipes, sewers, cesspools, or to the sources of water supply. It is important that the defect be promptly discovered and remedied. In some cases it may be advisable at once to remove patients to other quarters.

Cases may be treated in hospital wards containing patients with other diseases, without any risk of the latter being infected. Removal or isolation of typhoid cases, therefore, is not necessary. In Bellevue Hospital the rules require the exclusion of fever cases; but it necessarily happens not infrequently that cases are admitted which prove to be cases of typhoid fever, the diagnosis not being determinable until after admission. The removal of these patients exposes them to an unnecessary danger, and cannot, therefore, with propriety, be sanctioned by the medical attendants. Moreover, to transfer patients with typhoid fever to wards containing cases of typhus, is reprehensible, because they are thereby exposed to the contagion of the latter disease. The author has known typhus fever in repeated instances to be contracted by patients treated in wards containing cases of that disease.

In private practice, a patient with typhoid fever, if in a small, ill-ventilated room, should, if practicable, be at once removed to one the least open to these objections. If without a carpet and heavy window-curtains, so much the better. The room should be freely ventilated repeatedly during each day, by opening the windows as widely as possible. The fact that a fever patient cannot "catch cold," should be reiterated by physicians so often that eventually it may become a popular axiom. The temperature of the room should be kept uniform at from 60° to 70°, and by open fire-places in preference to furnace heat.

Good medical treatment is to be supplemented by good nursing. Aside from the proper administration of remedies, the giving of food and alcoholics, the employment of baths or sponging of the body, there are attentions which are peculiarly required in this disease on account of the mental condition of patients. Fluids are to be given very freely, although not asked for; the position of the patient should be frequently changed; the collection of sordes on the teeth and lips is to be prevented; the coating of the tongue should be in a measure removed, and this organ kept moist by the constant application of some liquid; pains are to be taken to prevent the evacuation in bed of urine and feces; if this cannot be prevented, the discharges should be instantly removed, and the person kept clean and dry; bed-sores are to be prevented by early attention to the erythema which precedes their occurrence. These are the more important of the points embraced in the hygienic treatment, the importance of which need not be dilated upon.

Treatment in Convalescence.

Solid, easily digestible food may be allowed in convalescence, as soon as the patient has a desire for it. In view, however, of the condition of the small intestine, involving still a liability to perforation, the food should be carefully kept within the capacity of complete digestion, and the kinds of food should be completely digestible, so as to leave but little fecal residue. Quietude should be enjoined particularly, or exceptionally, in this disease, during convalescence, until sufficient time has elapsed for all danger from perforation to have passed away. The author has known of a case in which perforation and fatal peritonitis occurred, when the patient had so far convalesced that he was out of doors. There is no need of regulation of diet, confinement to the house, etc., for the purpose of preventing a relapse of the fever. Errors in these respects may retard convalescence, but they are never adequate to cause a recurrence of the febrile career.

TYPHUS FEVER.

This species of continued fever, generally attributable to a miasm containing a contagium, is sometimes apparently produced by concentrated emanations from the bodies of healthy persons. It is very rarely an indigenous disease in this country, but is imported from abroad. In severe cases, stupor, which the name typhus denotes, is a prominent feature. An eruption having distinctive characters usually occurs. The fever has a self-limited duration, in the great majority of cases not exceeding fourteen days, but, in rare instances, extending to twenty days. It has no known anatomical characteristics. The period of incubation is rarely longer than twelve days, and it may be much shorter. Other names than typhus are hospital, camp, ship, and jail fever. Each of these names points to overcrowding as auxiliary to, if not sufficient for the production of, the specific cause of the disease.

The diagnosis of typhus involves its discrimination from typhoid fever. These two species, up to a recent date, were considered as varieties of one disease. At the present time, few, if any, doubt their non-identity. Although essentially as distinct as rubeola and scarlatina, they have certain features in common. The points of dissimilarity are, however, sufficient for their differentiation. It will suffice to consider these. To distinguish typhus from the essential fevers, other than typhoid fever, is unattended by difficulty. As typhus in this country is very rarely, if ever, a sporadic disease, the diagnosis is aided by a knowledge of the fact of its prevalence as an epidemic. Isolated cases may occur from exposure to the infection at a distance from the places where the disease is developed; and the disease may also be transported by means of fomites. It is chiefly in connection with the isolated cases thus produced, that a question arises as to the diagnosis.

During the first few days of the febrile career, the diagnostic points are chiefly negative. The duration of the prodromic period is less than in cases of typhoid fever, the average being two or three days, and, not infrequently, the patient at once taking to the bed. The temperature is higher, and the pulse more frequent, than in most cases of typhoid fever. Aside from these points, the absence of epistaxis, and the fact that the abdominal symptoms of typhoid fever are wanting, must be relied upon for the differential diagnosis.

In four or five days after taking to the bed, the eruption appears. It is present in the great majority of cases. In contrast to the eruption in typhoid fever (*vide* page 679), it has the following characters: After a day or two from its appearance, it is maculated, not papular; it is present on the limbs as well as trunk, and sometimes on the face; the color is a dark or dusky, not a rose, redness; the redness does not readily disappear on pressure; the spots do not come and go, but remain during the greater part, or the whole, of the period of the disease, and are visible on the cadaver. The abundance of the eruption is, in a measure, proportionate to the severity of the disease. True petechiæ, that is, ecchymoses, and vibices, are occasionally observed; also the blue spots (taches bleuatres), and miliary vesicles, as in cases of typhoid fever. Herpes of the lips is an occasional eruption.

The face has a dusky redness, especially marked on the cheeks; and, in a less degree, this appearance extends over the body. The conjunctivæ are congested. The facies, in these regards, differs from that of typhoid fever, so that the discrimination can be made with much certainty from this alone.

Some physicians and nurses have declared the odor from the body in cases of typhus to be sufficiently characteristic for the recognition of the disease by this symptom alone.

Diarrhœa occurs in a very small proportion of cases. As a rule, there is constipation. Tympanitic distension, tenderness, and gurgling are wanting. Intestinal hemorrhage is a very rare event.

The symptoms referable to the nervous system are essentially the same as in typhoid fever; but delirium, stupor, and subsultus occur more frequently, at an earlier date, and oftener in a marked degree. Albuminuria exists in a larger proportion of cases, and uræmic convulsions are less infrequent. Epistaxis is rare.

Pneumonia is a less frequent complication than in cases of typhoid fever. Hypostatic congestion is more frequent. Suppuration of the parotid or the submaxillary glands may occur alike in both fevers. This is true also of thrombosis of the iliac or femoral veins, gangrene of the lower limbs, and acute œdema of the glottis.

Typhus may be blended with scarlatina, dysentery, diphtheria, variola, and with typhoid fever.

In the diagnosis of typhus, age is not to be considered. The susceptibility to the special cause exists at all periods of life. Pregnancy does not secure exemption; and, in a certain proportion of cases, abortion is not produced, the patient passing through the disease safely, and giving birth to a living child.

Prevention of Typhus Fever.

The prevention of typhus fever involves protection against three sources of danger, namely: overcrowding and deficient ventilation in prisons, ships, camps, pauper houses, hospitals, and private dwellings; also against an infectious miasm from the bodies of those affected with the disease, and fomites.

The danger from the first of these sources is vastly less than formerly, now that the importance of sufficient space and ventilation in public institutions is better appreciated. In the dwellings of the poor there is often much overcrowding in illy-ventilated rooms. This should be prevented, if necessary, by legal measures, especially during the prevalence of typhus.

Protection against the infectious miasm from the sick requires that patients should, as far as possible, be isolated. In hospitals, cases of typhus should not be received in wards with other patients. Cases of typhus and typhoid fever should not be treated in the same ward. The probability of the communication of the disease to physicians and nurses is small if there be free ventilation.

The propagation of the disease by fomites is prevented by disinfection of the clothing and bedclothes of typhus patients. In private houses, the rooms occupied by patients should be afterward newly painted and whitewashed, wall-paper should be renewed, the floor and furniture should be washed with a disinfectant, and they should remain unoccupied for a week, the windows constantly open.

If these measures be fully carried out, the generation and diffusion of the disease will be prevented.

Treatment of Typhus Fever.

The treatment of typhus is essentially the same as that of typhoid fever. As regards abortive, curative, palliative, and sustaining measures, those considered respectively under these different headings in connection with the latter (*vide* page 688 et seq.) are alike applicable to the former disease. The points of difference relate to indications derived from certain events and complications of typhoid which rarely occur in typhus fever, the more important being diarrhœa, intestinal hemorrhage, tympanites, and peritonitis.

RELAPSING FEVER.

The disease now known by the above name, in place of the great variety of past designations, is not indigenous in this country. Cases were reported by Clymer in 1844, and by the author in 1850–51. They were confined to recent Irish emigrants. The disease did not spread from these cases. There is no record of its ever having prevailed prior to 1869. It was then imported. It prevailed to some extent in New York and Philadelphia in 1869 and 1870. Its prevalence was undoubtedly due to a contagium. It disappeared, and, up to this date (July, 1879), has not reappeared.

The diagnostic characters, which are sufficiently well marked, are embraced in the following summary: The invasion is abrupt, that is, without any prodromic period, and is marked by a pronounced chill, followed by fever. In most instances the patient at once takes to the bed. In a considerable proportion of cases, perspiration, either moderate or profuse, occurs shortly after the attack, and may recur repeatedly during the febrile paroxysms. The fever rapidly becomes intense, the axillary temperature quickly rising to 103°, and the pulse ranging from 100 to 140. During the paroxysm the temperature may exceed 105°. The daily fluctuations of temperature are slight and irregular. The fever continues for from five to seven days, in the majority of cases. Exceptionally, the duration may be as short as two, or it may extend to twelve days. The fever ceases abruptly, that is, within a few hours, and the defervescence is usually accompanied by profuse perspiration. There is complete apyrexia, the temperature and the frequency of the pulse not infrequently falling temporarily below the normal standard. The apyrexial period or intermission usually lasts about seven days. Exceptionally it does not exceed three, and it may extend to twelve days. A relapse of fever occurs, which, like the primary attack, is generally sudden, the chill being less pronounced. The intensity of fever in the recurring paroxysm is generally less, but it may be greater, than in the first paroxysm. The duration of the second paroxysm is from three to five days, the maximum being ten days, and the minimum a single day. The relapse is sometimes wanting, and, on the other hand, there may be two or more relapses. During the febrile paroxysms nausea and vomiting are frequently more or less prominent symptoms. Occasionally blood is vomited, the appearance being like that of the "black vomit" of yellow fever. This is a rare occurrence, and is generally associated with hemorrhage in other situations. Diarrhœa is rare, and also tympanitic distension of the abdomen. Tenderness over the liver and spleen exists in a certain proportion of cases. Jaundice occurs occasionally. Arthritic and muscular pains are constant symptoms. They exist in a notable degree, and are the chief source of suffering. They continue into the intermission, but are more marked in the paroxysms. Delirium is sometimes incident to the fever, but is not a constant symptom, and the symptoms belonging to the "typhoid state" are wanting. There is no characteristic eruption. Roseola, sudamina, and true petechiæ are sometimes observed. There is no tendency to important complications. A peculiar form of ophthalmia is an occasional sequel. Pregnant women pass through the disease safely, but the child, as a rule, is stillborn. There are no characteristic lesions found after death.

The foregoing sketch represents a disease which cannot readily be mistaken for any other. The relapse is sufficient for its recognition as a distinct species of fever; and other points in the clinical history are distinctive. A sporadic case in which, exceptionally, only a single paroxysm occurred, might be considered as a case of febricula. But the disease is not developed sporadically in this country. If met with, it will be among recently arrived emigrants, or as a prevailing disease diffused by contagion. Under these circumstances, with a recollection of the diagnostic features, it is easily discriminated from other fevers.

Prevention of Relapsing Fever.

Protection against the contagium in this country secures exemption from the disease. It belongs in the group of contagious miasmatic diseases, that is, the contagium is contained in the impalpable emanations from those affected with the disease. Without entering into etiological questions which lie without the scope of this work, it may be mentioned that a peculiar vegetable organism has been observed in the blood during the febrile paroxysms, which disappears after defervescence; and it is claimed that the parasitic causation is thus demonstrated. If the demonstration be accepted as regards this disease, reasoning by analogy it is a logical conclusion that it is merely a question of time in regard to the demonstration of the truth of the germ theory in its application to other fevers.

It appears to be clearly established that the susceptibility to the contagion of relapsing fever is much increased by destitution, particularly as regards food. Over-crowding and defective ventilation are powerful auxiliaries in the diffusion of the disease. That the disease may be communicated by fomites seems also certain.

It follows that the preventive measures are the same as with regard to typhus fever. Patients should be isolated in hospitals and private dwellings. Provisions for free ventilation are important. The clothing and bedclothes of patients should be disinfected and thoroughly washed. In Bellevue Hospital, between November 14, 1869, and February 6, 1870, during which time 103 patients with this disease were received, twelve persons contracted the disease, all having been brought into immediate contact with those affected with it.

The period of incubation in the majority of cases is from five to nine days. In some cases the disease is developed directly after exposure, and the maximum of duration is sixteen days.

Patients who have this disease are not thereby rendered afterward insusceptible to the special cause. In this respect it differs from typhus and typhoid fever.

Treatment of Relapsing Fever.

The fatality from this disease is extremely small, falling short of two per cent. Death may be due to uræmia. Probably in these cases renal disease existed prior to the fever. The disease may kill by exhaustion or syncope without any important complication. This is more likely to occur in persons weakened by innutrition before contracting the disease. Affections, other than those of the kidneys, accidentally associated, may determine a fatal result. Of 103 cases treated in Bellevue Hospital, two were fatal, one from uræmia, and the other from syncope occurring unexpectedly at the termination of the first paroxysm.

Experience has, as yet, discovered no abortive measures. The treatment has reference to symptomatic indications. Hyperpyrexia indicates antipyretic measures. Quinia, however, in full doses is found to be useless as an antipyretic remedy in this disease. The abstraction of heat by the cold pack or sponging the body is the most effective plan. The arthritic muscular pains require opium. Diminution of urine, or a low specific gravity, is a highly important indication for diuretic remedies or measures for the vicarious elimination of urea, namely, hydragogues and the warm or hot-air bath. Alcoholics are indicated if the symptoms denote asthenia. Alimentation is important during the paroxysm, and especially in the apyrexial period, in proportion as support is indicated, and particularly when the disease occurs in persons suffering already from innutrition.

The treatment in convalescence is essentially the same as in typhoid and typhus fever.

CEREBRO-SPINAL FEVER. CEREBRO-SPINAL MENINGITIS.

This disease very rarely occurs save when it prevails, to a greater or less extent, as an epidemic. Sporadic cases, however, are occasionally observed. That it is to be regarded as a purely inflammatory affection of the meninges of the brain and spinal cord, no one will assert. It, therefore, belongs among the general diseases. That the fever is not altogether symptomatic, will be admitted. Hence it is an essential fever, characterized by a localized inflammatory process from the beginning. These are the grounds for placing the disease in the list of fevers; and if thus placed, it is included among the continued, more properly than the periodic or eruptive fevers. The name cerebro-spinal fever is adopted as more appropriate than spotted, petechial, or purpuric fever. The significance of these terms is derived from the occurrence of petechiæ which occur in other affections, and are present in only a small proportion of the cases of this disease. The name cerebro-spinal typhus is inappropriate, inasmuch as the disease cannot be considered as a variety of typhus fever. It is analogous to typhoid fever in the fact that a localized affection is coincident with the commencement of the disease. In this regard a more striking correspondence is with acute lobar pneumonia or pneumonic fever. On similar grounds the latter should have been placed among the fevers; and in not doing so, the author has complied with usage rather than nosological propriety. It should be added, the name epidemic cerebro-spinal meningitis is at present the one most frequently adopted.

As an epidemic, or rather pandemic, this disease is distinguished by the occurrence simultaneously of outbreaks in widely separated situations; the outbreaks recurring generally in the winter or spring months, during a period of from ten to fifteen years, after which, for a series of years, they cease to recur. "These two conditions, of simultaneous appearance in widely remote places, and of annual recurrence for a series of years, characterize no other disease whatever."[1] Its prevalence does not involve a contagium. It is further distinguished by its great fatality, and by its proving fatal not infrequently within a brief period, that is, a few days or even hours. Its anatomical characteristics are the appearances which denote meningeal inflammation at the base of the brain, and within the spinal canal. These are wanting only in cases which are very rapidly fatal.

The symptomatic history offers much diversity; but the symptoms common to all cases give to the disease a distinctive character which renders its recognition not difficult. It commences, in most instances, without prodromata. If these occur, they are of brief duration, and not distinctive. The invasion opens with a pronounced chill and rigor, or a series of chilly sensations, occurring between noon and the following morning. The earliest, most prominent and most diagnostic of the symptoms which follow, are those proceeding from the cerebro-spinal inflammation. Pain in the head, referred to the anterior or posterior portion, or in both situations, sharp or lancinating in character, is rarely wanting, and is generally intense. Its intensity often extorts moaning or sharp cries. It continues for several days, unless the patient pass into deep somnolency or coma. The facial expression denotes severity of suffering. In most cases, pain, more or less severe, is referred to the back of the neck, the spine, the limbs, and different situations in the trunk. Vertigo is a prominent symptom, especially if the patient rise in bed, or attempt to walk. The pain frequently occasions, for a time, great restlessness. Delirium is frequently more or less prominent. It is generally passive, but in some instances active or maniacal, requiring restraint. Somnolency, semi-coma, or a completely comatose condition, are apt to occur on the second or third day. In some of the cases distinguished as fulminant (fourdroyante) or apoplectiform, which may end fatally within a few hours, complete coma follows speedily the invasion. The position in the somnolent or comatose condition is characteristic, especially in children. The patient lies with the head retracted by tonic contraction of the muscles of the nucha; the posterior muscles of the trunk are rigid, causing sometimes a certain degree of opisthotonos; the thighs and legs are flexed.[2] The contraction of the muscles continues throughout the course of the disease. Hyperæsthesia of the skin is generally marked, and has diagnostic significance, inasmuch as it is a rare symptom in other fevers. It is manifest even when patients are semi-comatose. Movements of the limbs or of the body cause suffering, and patients, if allowed, sometimes remain for several days in the same position. Paralysis is rare. It sometimes occurs, and may be either partial or general, very rarely the latter. Strabismus is a frequent symptom. It is sometimes intermittent, and sometimes persistent. The pupils are generally affected, but without uniformity in different cases. They may be dilated, or contracted, or unequal, and their mobility is often diminished. Congestion and inflammation of the conjunctiva are common. Hyperæmia of the optic disk is frequently observed. In some cases the internal structures of the globe of one eye, or both eyes, are the seat of inflammatory changes which lead to either unilateral or bilateral blindness. Internal otitis and suppurative ulceration in the labyrinth, are complications in a certain proportion of cases. They may disappear, leaving the sense of hearing unaffected, but occasionally causing complete bilateral deafness.

---

[1] Epidemic Meningitis or Cerebro-spinal Meningitis, by Alfred Stillé, M.D., 1867.

[2] For a figure illustrating these characters, *vide* article of Prof. J. Lewis Smith, in Am. Journ. of Med. Sciences, October, 1873.

The foregoing symptoms combined, form a picture as distinctive of the disease in life, as the appearances after death are characteristic. Of other local symptoms, vomiting is often prominent at the outset. The vomiting is not preceded by nausea, nor is it dependent on ingesta, and the proximate cause is plainly cerebral. Thirst is often not urgent. Anorexia is the rule. Constipation and a normal volume of the abdomen, are more frequent than diarrhœa and tympanites. The urine has nothing distinctive. The respirations are generally increased in frequency out of proportion to the acceleration of the pulse, although no pulmonary complication may exist. The skin may present various eruptions in the course of the disease. From the occasional occurrence of petechiæ, the disease was formerly called, in this country, "spotted fever." An herpetic eruption around the mouth is not uncommon. Erythema, sudamina, and urticaria, sometimes occur. There is no characteristic eruption, and, in the larger proportion of cases, there is none whatever.

The general symptoms, that is, the pulse, temperature, and muscular strength, are extremely variable. Generally the pulse is more or less accelerated, the increased frequency varying much in different cases. It is very variable at different times in the same case. A little exertion may cause an increase of forty beats. In rare instances the pulse is below the frequency of health, in the early part of the disease. The temperature presents, in different cases, notable variations. It is always more or less raised. It is sometimes high, 105° or more, directly after the initial chill, becoming, perhaps, lower on the second or third day. Irregular fluctuations are apt to occur during the course of the disease. In some cases the increase of temperature is small. The disease is without any thermometrical laws. In severe cases the prostration, from the outset, is great; greater than in the early period of most other essential fevers.

There is generally little room for doubt as to the diagnosis of uncomplicated cerebro-spinal fever, except in the very rare instances in which the disease is sporadic, or at the commencement of an epidemic before the fact of its existence has been determined.

In sporadic cases it may not be always easy to decide whether the disease be an essential fever or a purely local affection. The general rules for distinguishing the former from the latter (*vide* page 671), are to be followed in deciding this question.

With the knowledge of the existence of an epidemic, the direct evidence afforded by the symptoms is sufficient for the diagnosis. As regards discrimination from the other essential fevers, into the clinical history of none does the group of symptoms representing cerebro-spinal meningitis *enter*. In addition, symptoms which are diagnostic of the other essential fevers, *e. g.*, typhus and typhoid fever, remittent fever, etc., are wanting in cases of this disease. Cases of pernicious intermittent fever, in which the patient passes at once into a fatal coma, have some resemblance to the fulminant cases of cerebro-spinal fever. But a pernicious paroxysm is preceded by at least one paroxysm in which the malarial nature of the disease is evident without alarming symptoms; and in the pernicious paroxysm, certain symptoms denoting cerebro-spinal meningitis are not present, namely, rigidity of the muscles of the neck, opisthotonos, intense cephalalgia, vertigo, strabismus, affections of the pupil, and vomiting. The preceding history, in connection with the points just enumerated, and the examination of the urine, will serve to exclude uræmia.

During the existence of an epidemic, especially when it is about to cease, cases occur in which the disease is so mild that, at another period, its character might not be recognized. In these cases the cerebro-spinal symptoms are comparatively slight, the fever not intense, and convalescence speedily takes place. In some cases the disease commences with symptoms which denote considerable severity, and it spontaneously aborts. The diagnosis of the latter cases, if the disease did not prevail as an epidemic, would hardly be made.

Complications would render the diagnosis of the disease difficult were it not for the knowledge of its epidemic prevalence. It is sometimes associated with pneumonic fever, the latter being either the primary or secondary affection. Parenchymatous nephritis, in some cases, is developed secondarily. Cases rarely present these associated diseases. Other complications apparently occur as coincidences, that is, without any pathological connection with the disease.

Age is never a ground for the exclusion of the disease, although it affects children much oftener than adults; but it may occur at any period of life. The fact that the disease has been already experienced, is of no weight against the diagnosis.

Treatment of Cerebro-spinal Fever.

The nature of the special cause of this disease has not been discovered. Certain facts, however, relating to the etiology, which are known, are to be considered in relation to preventive measures. The disease is not directly communicable. Isolation of cases, therefore, as a protection against its diffusion, is not necessary. But removal of persons from without the area in which the disease prevails is desirable. It is yet to be ascertained whether the disease can be "stamped out" by local disinfecting measures. Unsanitary surroundings, such as overcrowding, defective ventilation, sewer emanations, and the like, although in themselves inadequate to produce the disease, undoubtedly act as auxiliary causes. This has been conclusively shown by the localizations of the disease in the city of New York. The majority of cases occur in situations in which persons are exposed to the causes just named. Cases occur in houses where it would be expected that these causes do not exist; but not infrequently the most luxurious and palatial residences are sadly defective in proper hygienic precautions. Cases of the disease whenever they occur, should always excite suspicion of something wrong in a sanitary point of view. And this suspicion should be expressed, albeit it is often received with not only distrust, but vexation.

The disease cannot be made abortive by any measures of treatment as yet known. Curative measures are among the things to be discovered. It follows that the treatment, in the present stage of medical progress, is limited to fulfilling symptomatic indications, palliation, and support.

The symptoms, at the outset, which furnish important indications, are those denoting inflammation of the meninges of the brain and spinal cord. Cupping over the nucha and spine is indicated. Wet cupping may be employed if the patient be robust, or in full health when attacked. If otherwise, the cupping should be dry. Cold applied to the head and spine lessens hyperæmia, and is, at all events, a potential palliative measure. If there be hyperpyrexia, the heat should be reduced by sponging the body with cold or tepid water. This is preferable to the cold bath, owing to the suffering caused by moving the patient. It is preferable to quinia given as an antipyretic remedy in this disease. Frequency of the pulse, with a high temperature, is an indication for cardiac sedatives, especially aconite. The intensity of pain calls for opiates. The use of these forms an important part of the treatment. The subcutaneous injection of morphia is the preferable method of administration. The utility of opiates appears to be not limited to the mere relief of suffering; their influence on the disease is apparently salutary. They should, however, never be used to the extent of producing narcosis. The bromides have a favorable effect. They should be given in doses sufficient to secure their tranquillizing effect, but not to the extent of causing bromism. The iodide of potassium is indicated for the same reasons as in cerebral and spinal meningitis. The utility or the inutility of mercury given for the objects which the iodide of potassium is supposed to promote, namely, limiting exudation, and as a sorbefacient, is to be determined by further clinical observations. Meanwhile, inasmuch as the objections thereto are of little consequence in so fatal a disease as this, provided there be any ground for supposing that they may be useful, they should enter into the treatment. To secure their supposed remedial effect they may be given in large doses, guarded by opium to prevent catharsis, or in small doses repeated after short intervals. Alcoholics are indicated by frequency and feebleness of the pulse, and by weakness of the first sound of the heart over the apex, as in other fevers. As entering into the supporting treatment, alimentation is important.

Among the peculiarities of this disease, as already stated, are its brief duration, and the large percentage of fatal cases. In the so-called fulminant cases death takes place within a few hours. The patient generally passes at once into apoplectiform coma, and apnœa is an element in the mode of dying. In some of these cases, however, death takes place by rapid asthenia. In the majority of fatal cases, the duration does not extend beyond five days. A duration of over ten days is extremely rare. The uncertainty of the duration in cases which recover is a notable feature. Recovery may not take place for many weeks or months. In these cases, however, the long duration is due to local conditions within the skull and spinal canal, which are properly to be regarded as sequels of the disease. Death taking place after a long duration is attributable to the sequels. The mortality varies from 30 to 70 per cent. There are few diseases which show a higher death-rate than this. As in other epidemics the fatality from the disease is greater in the early than in the latter part of the period of its prevalence.

A peculiarity of the disease is the great uncertainty as regards the prognosis. Deep coma, hyperpyrexia, and notable feebleness of the heart's action are fatal prognostics. If these be not present, a favorable termination may be hoped for, but should never be predicted with confidence. False hopes are not infrequently raised by remissions and by a degree of improvement seeming to betoken speedy convalescence. Relapses sometimes occur after distinct convalescence.

Permanent injury of the organs of either sight or hearing, or of both, in a certain proportion of cases is a sad result of the disease. Complete blindness or deafness may follow it. The former is oftener unilateral, and the latter is generally bilateral. Paralysis and impairment of the mental faculties are occasionally sequels. As a rule, the restoration of health, and especially of the powers of the mind, requires many months. Greater care than in most other diseases is requisite during convalescence in regard to dietetic excesses, exposure, physical exertions, and particularly mental excitement, or intellectual work.

Diphtheritic Fever. Diphtheria.

Diphtheria, whatever views may be held respecting its etiology and the characteristic manifestations in the pharynx or elsewhere, is a general disease. The constitutional symptoms represent something more than the local affections. The pyrexia is not merely symptomatic of the latter; the disease is therefore a fever. The term diphtheritic fever is not inappropriate. That it has a special causation is shown by its prevalence as either an epidemic or an endemic, together with the fact that it disappears and again reappears after very long intervals of time. Of the latter fact, this country affords a striking illustration. It prevailed here, and was described by Bard, in 1771; after this date it did not prevail until about 1856, an interval of eighty-five years.

Diphtheria may be defined a febrile disease having as its anatomical characteristic an inflammatory process with fibrinous exudation, the latter forming a false membrane which is thrown off after a period varying from four to ten or more days—a second and third membranous formation sometimes taking place; the primary situation in the vast majority of cases being the fauces, the process often extending to the mouth and nares, exudative laryngitis, tracheitis, and bronchitis not infrequently occurring, the exudation sometimes extending along the œsophagus and even into the stomach; the diphtheritic process occasionally affecting, secondarily, the mucous membrane near the anus, within the vulva, the prepuce, the conjunctiva, the Eustachian tube, the middle ear, and, also, abraded or wounded parts on the cutaneous surface; the submaxillary and cervical glands being generally inflamed and sometimes suppurating; ulceration and gangrene occurring as rare results of the local process within the pharynx; the disease occasioning notable anæmia; parenchymatous nephritis sometimes accompanying or following it; paralysis of the pharyngeal muscles, disorders of vision, and paralytic affections in various situations being not infrequent sequels.

The clinical history, epitomized, is as follows: In most cases the onset of the disease is more or less violent. A pronounced chill is rare, but chilly sensations occur followed by pyrexia; the increase of temperature, as a rule, being moderate, but, exceptionally, high; the pulse accelerated, and the prostration causing the patient at once to keep the bed. In some cases the development of the disease is gradual, as denoted by both the local and general symptoms. There is great diversity in different cases during the course of the disease as regards its mildness and severity. It is sometimes extremely mild, the patient not taking to the bed. In these cases the diphtheritic process is confined to the fauces, and is comparatively slight. A diffusion of the process over the buccal and nasal surfaces is always accompanied by symptoms denoting severity in a greater or less degree. The frequency of the pulse varies in different cases, and often at different periods in the same case. It may become less frequent than in health. In severe cases it is often irregular or intermittent. The thermometric variations are equally great. The surface of the body is generally cool. Vomiting and diarrhœa are not infrequent symptoms. Epistaxis occurs not infrequently, and is sometimes so profuse as to prove a source of danger. In a considerable proportion of cases the urine is albuminous, the quantity of albumen being generally small. Epithelial and hyaline casts are sometimes found. A petechial eruption on the skin is an occasional event. An erythematous efflorescence in children is not uncommon. Delirium is rare.

The symptoms referable to the local affections constitute an important part of the clinical history. Soreness of the throat and pain in swallowing are caused by the pharyngeal affection. These symptoms, however, are by no means marked in all cases, and in some instances are wanting. Owing to the latter fact, the disease may for some time be overlooked. Professor J. Lewis Smith states that he has known the disease to be mistaken for mumps from the glandular swellings, the pharynx not having been examined. The decomposition of the false membrane during the process of sloughing gives to the breath a fetid odor, if not prevented by local antiseptic applications. The affection within the nostrils causes obstruction to respiration through these passages, and an ichorous discharge which excoriates the upper lip. Pain in the ear, deafness, and, in some cases, perforation of the tympanum are caused by an extension of the affection from the pharynx through the Eustachian tube.

Exudative laryngitis is an exceedingly grave complication. The symptoms are those of this disease occurring as a purely local affection (*vide* page 149). The liability to this complication is confined chiefly to the early part of the course of the disease. It is useful to bear in mind that there is comparatively little danger of its occurrence after the first week. The desirableness of a sense of security on this score is apparent, when it is considered that very few patients recover if the air-passages become affected. In very rare instances the larynx is the primary seat of the local manifestation of the disease. The affection seated in the œsophagus may occasion an obstruction to deglutition, and within the stomach it gives rise to notable gastric disturbance. It causes more or less pain and disturbance in other situations. It may lead to loss of vision if seated upon the cornea.

The diagnosis of diphtheria is to be based on the appearances within the fauces. The presence of an exudation or false membrane is essential. It is not improbable that the special cause of the disease may produce a pharyngitis without exudation either in the pharynx or elsewhere; but, if so, a positive diagnosis is impracticable. The liability to overlook the pharyngeal affection, when there is no complaint of soreness or pain in swallowing, has been already referred to. Aside from this error, whatever difficulty pertains to the diagnosis lies in discriminating a diphtheritic exudation from a follicular secretion. The latter mistake is not infrequently made. An accumulation of follicular secretion may, on superficial examination, present an appearance not unlike that of a diphtheritic exudation. It is, however, confined chiefly or exclusively to the tonsils; it is pultaceous, not membraniform; it may be seen to dip down into the follicular depressions; it may be wiped away, whereas an exudation is torn off in strips. If the layer be thrown off within twenty-four or thirty-six hours, this is proof of its having been a secretion and not an exudation.

Diphtheria can be confounded with exudative laryngitis, of course, only when the diphtheritic affection extends into the larynx. In exudative laryngitis (croup), the pharyngeal affection is comparatively small, and it either follows or is coincident with the laryngitis; whereas, in diphtheria, the exudation in the pharynx precedes, usually for several days, the laryngeal affection. The local disease commonly known as croup very rarely occurs except between the ages of two and seven years. Diphtheria is not thus restricted. It occurs oftener in childhood, but infancy, middle life, and old age are by no means exempt from the liability to its occurrence. The symptoms in croup denote a local, not a general, disease. The paralytic sequels of diphtheria are wanting. A retrospective diagnosis may be based on these circumstances.

In the course of the disease, so long as the voice remains unchanged, the physician may feel assured that the larynx is unaffected. Hoarseness and aphonia are evidence of laryngitis, but not necessarily of exudation. The latter is, however, probable, and is almost certain if there be laryngeal obstruction. Positive information is derived from inspection by means of the laryngoscope; but, in infants and children, a laryngoscopic examination may be impracticable.

Diphtheria occurs in combination with other diseases, *e. g.*, scarlatina, rubeola, typhoid fever, etc.

Prevention of Diphtheria.

Diphtheria has, of course, a special cause which, it may be assumed as at least probable, is a specific germ or living organism. It is a general belief that the disease is communicable by a fragment of the diphtheritic exudation coming into contact with a mucous surface, and, also, by means of miasmatic emanations from the body. That the specific germ may be produced outside of the body seems certain; in other words, the disease is not exclusively caused by a contagium. It is equally certain that the prevalence of the disease is in a great measure attributable to deleterious hygienic conditions, which either promote the production of the special cause or increase the susceptibility to it. Preventive measures are to be based on these facts.

The occurrence of diphtheria in any situation should lead at once to an examination of houses in which cases occur, and their surroundings, with reference to unsanitary conditions relating to waste-pipes, sewers, cesspools, overcrowding, defective ventilation, etc., and to the removal of any causes of disease which may be discovered. It remains to be ascertained whether this disease can be "stamped out" by the prompt and efficient employment of disinfecting agents whenever and wherever it occurs. Patients affected with the disease should be isolated as far as practicable. Vessels receiving the excretions should be disinfected. Everything coming into contact with the patient should be disinfected or destroyed, and disinfection should be added to thorough cleaning of the rooms and furniture after cases have terminated. In short, those measures preventive of the diffusion of the disease by contagion are indicated, which are employed in other diseases undoubtedly contagious; for example, scarlatina.

The period of incubation in cases of diphtheria ranges from three to seven days. After a week from the date of exposure, there is little, if any, liability to the development of the disease.

Treatment of Diphtheria.

Certain pathological questions which are at present *sub judice*, have a decided bearing on the rational objects of treatment in cases of diphtheria. It is held by some late writers (*vide* Oertel, *Ziemssen's Cyclopædia*), that the disease is caused by vegetable organisms (Bacteria micrococci), which, obtaining a foothold in some part, generally the pharynx, produce an inflammatory process with exudation, and that these organisms, multiplying and migrating, produce the general disease, together with the localizations of the diphtheritic process in other situations. According to this etiological doctrine, the disease is primarily local, and secondarily general. It is obviously a rational object of treatment, if this doctrine be accepted, to destroy the organisms in the part first affected as promptly as possible, thereby preventing the disease from becoming general. Waiving discussion of this doctrine, suffice it to say, it is by no means certain that the disease is dependent on the organisms discovered in the throat or elsewhere, or that it is primarily a local affection. Clinical experience has not, as yet, demonstrated that the disease may be arrested by parasiticidal applications to the pharynx; yet it is highly probable that the destruction of organisms, which are undoubtedly present in the diphtheritic exudation, is of more or less importance in the treatment.

Another pathological question relates to the absorption of septic matter from parts in which the diphtheritic affection is seated, whether the affection be or be not considered as primarily local and parasitical. The question is, whether the disease involves septicæmia as an important element. That it does is highly probable, and, therefore, to prevent the absorption of septic matter is a rational object of treatment.

The bearing of the foregoing pathological questions is especially on the local treatment of diphtheria. Clinical experience has demonstrated the inutility, if not the injury, of caustic topical applications. The nitrate of silver in substance or strong solutions, the mineral acids and alum powder, are no longer employed—at least in this country. These applications, and tearing away of the false membrane, increase the inflammation, and, by impairing the integrity of the tissues, favor the entrance into the system of septic matter. Moreover, if the false membrane be destroyed or removed, it is likely to be quickly renewed. The different remedies employed in the topical treatment act as disinfectants, astringents, and solvents.

Gargling is not practicable in young children, and, when practicable, it is doubtful if the liquid is brought fully into contact with the pharyngeal affection. Applications by means of a large camel's-hair pencil brush are preferable, or, what is still better, by means of spray. Oertel employs inhalations of a disinfecting spray, continued for a quarter of an hour, and repeated hourly or half hourly. He uses for atomization the following solutions: A 2.5 per cent. solution of chlorate of potash; a 0.1 per cent. solution of salicylic acid, and, in advanced septic decomposition, a 0.25 per cent. solution of permanganate of potash. For accelerating the process of suppuration, leading to the separation and expulsion of the false membranes, he attaches much importance to inhalations of hot steam, at a temperature of from 112° to 122°. As a solvent when the diphtheritic exudation exists in the larynx, he relies chiefly on lime-water spray.[1]

Prof. J. Lewis Smith recommends the following mixtures, applied either by a hand or a steam atomizer, the latter to be preferred: Salicylic acid ʒss, glycerine ℥ij, and lime-water ℥viij; carbolic acid gtt. xxxij, glycerine ℥ij, and lime-water ℥vj; carbolic acid gtt. xxxij, chlorate of potash ʒiij, glycerine ℥iij, and water ℥v. He states that the following mixture, applied to the fauces by means of a large camel's-hair pencil brush, is very effectual, converting the false membrane into an inert mass, and putting a stop to all movements of the bacteria which swarm in it: Carbolic acid gtt. viij, liquid subsulphate of iron ʒij or iij, and glycerine ℥j. This may be used two or three times daily between the spraying or without the latter. As a disinfectant mixture, to be applied within the nostrils, he advises the following: Carbolic acid gtt. xxiv, glycerine ℥ij, and water ℥vi. The applications are to be made by injections repeated every third or fourth hour. Lime-water spray he considers the most effectual solvent when the larynx becomes affected. He reports recovery of seven out of twenty-five cases in which exudation in the larynx undoubtedly existed, without tracheotomy.[2]

---

[1] *Vide* Monthly Abstract of Med. Science, Philadelphia, March, 1879, p. 104.

[2] *Vide* Am. Journ. of Med. Sciences, October, 1877.

Dr. Billington advises as a spray solution, fifteen minims of carbolic acid in six ounces of lime-water, the atomization produced by a perfumery atomizer.[1]

A medical friend of the author, who has had considerable experience in treating this disease, thinks highly of the chloral hydrate, a drachm to an ounce of glycerine applied to the fauces by means of a camel's-hair brush. Dr. James L. Rooker, of Indiana, claims that the exudation is prevented by carbolic acid applied by means of a spray producer.[2]

The astringent applications are supposed to be useful by preventing the absorption of septic matter. Some physicians employ the more potential astringents, *e. g.*, Monsel's solution. The tincture of the chloride of iron is used by many. Given internally, after short intervals, the good effect attributed to it is measurably referred to its local action as it passes over the affected fauces. When it is judicious to resort to topical treatment by means of a camel's-hair brush, in other words, when the patient is old enough to submit thereto without resistance, probably application of tannin and glycerine secures all the advantage to be derived from an astringent.

Solvent applications, if successful, are probably not of much importance elsewhere than in the larynx. In the latter situation, various solvents, in addition to lime-water, have been tried, namely, lactic acid, pepsin, the carbonate of lithia, etc., without marked success. There is perhaps room for supposing an error of observation in some of the cases in which solvent applications have appeared to be successful.

Cleansing the affected parts is important. Washing away the decomposed exudation may perhaps prevent septicæmia. Rinsing the mouth hourly, gargles, and the nasal douche, constitute not an insignificant part of the local treatment. To remove fetor, Prof. Lusk recommends insufflation of a powder composed of one part of pulverized salicylic acid and seven parts of bismuth. The application is best made by means of an "insufflator," consisting of an India-rubber bulb attached to a tube, the powder being introduced into an opening which can be afterward closed. In children this application is more easily made than remedies in a liquid form, and Prof. Lusk assures the author that the fetor is quickly remedied by it.

Is there any known specific remedy for the general disease? This question must be answered negatively, unless credence be accorded to the doctrine advanced by Dr. E. W. Chapman, namely, that a special morbid condition of the blood is antagonized by alcohol. Dr. Chapman claims that by the early administration of alcohol, as freely as it is tolerated without alcoholic excitation, in conjunction with quinia, the disease is curable. He bases this doctrine on the results of a pretty large clinical experience. He employs alcohol, not as a sustaining remedy, but as an antidote, comparing its efficacy to that which it has in cases of venomous snake bites. The claim in behalf of this method of treatment is not irrational, and it should be tried sufficiently to test its value. To the usefulness of alcohol in the treatment of this disease the author can add his testimony to that of others. The tolerance of alcoholics is, in some cases, notably increased by the disease. It should be given to the extent to which it is tolerated without any manifestation of its toxical effects. The novelty of Chapman's doctrine is that its utility depends on its antidotal effect, and that, therefore, the earlier in the disease it is given, the better, not waiting for evidence of failure of the vital powers. A French author, M. Sanné, considers alcohol the most effective of antiseptics which are administered internally, and that it is indicated in proportion to the intensity of the infection.

---

[1] *Vide* Trans. N. Y. Acad. of Med., 1876.

[2] *Vide* The American Practitioner, December, 1878.

The tincture of the chloride of iron and the chlorate of potassa, given internally, are much used by physicians in this country in the treatment of diphtheria. It is difficult to estimate with exactness the therapeutical value of these and other remedies which do not produce a marked effect upon either the duration of the disease or its fatality, for two reasons: firstly, because we have no data for knowing the duration and fatality in a series of cases in which no treatment was employed, and, secondly, because, as is well known, the disease varies in these regards, not only at different times and places, but at different periods during its prevalence in the same time and place. The general belief of observing practitioners is, however, sufficient ground for attributing to these remedies a certain measure of utility. Professor J. Lewis Smith prescribes them in combination. The bisulphite of soda is by some regarded as useful.

There is no disagreement among writers or practitioners respecting the importance of supporting measures of treatment They are to be employed in each case according to the indications, in other words, in proportion as the symptoms denote danger in the direction of asthenia. The general principles which govern their employment are the same as in other diseases which endanger life in that direction, *e. g.*, typhoid fever. These principles need not be here repeated.

Indications for treatment are derived from certain incidental events, such as hemorrhages, diarrhœa, and vomiting.

Cases in which the diphtheritic affection becomes developed in the air passages, involve, in addition to asthenia, a source of great danger, namely, obstruction of the larynx, and, in some instances, the smaller bronchial tubes. The proportion of recoveries is exceedingly small. The local measures of treatment are essentially the same as in membranous laryngitis and capillary bronchitis occurring as local affections. The latter affections have been considered in the section devoted to diseases of the respiratory system. When life is in danger from laryngeal obstruction, laryngotomy or tracheotomy is indicated. The probability of success from this operation is much less than in membranous laryngitis not connected with diphtheria. But the propriety of the operation is not dependent on the chances of success. The question is not in how many instances is it successful, but whether it is in any instances a means of saving life. The duty of resorting to it is not less because patients rarely recover. The responsibility of withholding it, if the chances be few, is as great as if there were many. With reference to this topic, the following quotations from an admirable lecture by Sir William

Jenner, published some years ago, are so pertinent and forcible, that it would be superfluous to commend them to the reader's attention:—

"With reference to the propriety of performing laryngotomy or tracheotomy, when the larynx is invaded by the exudative inflammation, there can be no doubt that some lives have been saved in this country by an opening being made into the larynx or trachea, when death from suffocation in croup and in diphtheria was imminent.

"A most unequivocal case of this kind was that of Dr. C. There is not a shadow of a doubt on my mind that he would have been dead in two minutes, had his larynx not been opened at the moment it was by Mr. Quain. I never saw any one so manifestly brought back from the threshold of death. His complexion had that bluish pallor that precedes immediate dissolution. My hand was on his wrist. I felt his pulse failing under my finger, until at last it was imperceptible. His eyes closed, and his diaphragm was making those convulsive contractions which indicate that respiration is about to cease, when the knife entered the larynx, and the air was drawn by what really seemed the last effort of the diaphragm into the lungs. The natural hue of his face returned; his pulse was again perceptible; his eyes opened; consciousness was restored; and the patient was alive again. He finally recovered. Now a thousand failures of the operation in saving life cannot, after seeing this case, prove to me that tracheotomy ought not to be performed when suffocation is imminent from the presence of lymph in the larynx or trachea; for here is a man, whose life was invaluable to his family, and most useful to society, restored to health, who, but for the operation, would have been dead. . . . .

"The mortality under any treatment is frightful, but tracheotomy will save a small proportion of cases—then why refuse life to those few? As you grow older you will know the satisfaction it is to have a well-founded conviction that in even a single case you have been the means of saving life. In the adult, laryngotomy is to be preferred to tracheotomy; the larynx is large enough to admit a tube; in children it is too small, especially when narrowed by swelling of its mucous membrane and exudation on its surface. In children, then, you must open the trachea; open it, however, as near to the larynx as possible. It is said, open below the seat of disease; I think the reverse should be the rule. If you open into the healthy part you establish a new centre of irritation and inflammation."

With reference to euthanasia, in commenting on a case in which the operation had been performed without recovery, he says: "The operation was successful so far as concerns the attainment of the object for which it was performed. The child would have died on the 5th of January, had the trachea not been opened; it lived to the 18th. Slow suffocation is one of the most distressing modes of death; death from asthenia one of the least. So that twelve days of life were gained, and much suffering was avoided by the operation. You will remember that I told you, that the laryngeal affection all but always kills within a week from its outset, and usually within three days, and that the general disease more slowly."

The danger of sudden fatal syncope on exertion, in cases of diphtheria, is to be borne in mind. This danger exists even in convalescence. Getting out of bed, and attempting to walk are to be interdicted until there is reason to believe that all danger from this source has passed away.

The sequels of diphtheria, namely, anæmia, various paralyses, and renal disease are to be recognized and appropriately treated. Paralysis of the pharyngeal muscles may prove fatal by inanition. The author has met with an instance. If food cannot be swallowed, it should either be conveyed into the stomach through an œsophageal tube, or life be maintained by rectal alimentation. If alimentation be thus received, the prognosis is favorable, as it is in paralyses situated elsewhere. The treatment having reference to diphtheritic paralysis has been considered in connection with paralytic affections (*vide* section V.).

ERYSIPELATOUS FEVER.

An erysipelatous inflammation of the skin presents the following characters: The surface over a considerable space is reddened, presenting a shining appearance, and notably tender to the touch; it is somewhat raised above the level of the surrounding skin; the temperature is increased, the integument is tense, and a burning pain is referred to the affected part. The inflammation generally spreads with more or less rapidity. It may wander over a considerable portion, and sometimes even the whole of the surface of the body (*Erysipelas erraticum*). Pitting on pressure is a feature in some cases (*Erysipelas œdematodes*). Bullæ or blebs not infrequently form, which result in crusts or scabs. Suppuration beneath the skin may occur (*Erysipelas phlegmonodes*), and sloughing sometimes takes place (*Erysipelas gangrenosum*). For more minute details, the reader is referred to works on surgery, or on cutaneous diseases. The appearances are sufficiently characteristic for a ready diagnosis. This form of inflammation can only be confounded with erythema. The latter is devoid of the swelling, tension, and shining appearance of erysipelas; the pain and heat are less; bullæ or blebs do not occur; suppuration does not take place, and sloughing is never a result.

Erysipelas is said to be traumatic when developed in connection with local injuries or surgical operations. Probably in these instances a general morbid condition is always involved, and the disease may be induced by a contagium. Its diffusion in this way in hospitals seems abundantly proven. Occurring independently of local causes, the disease is distinguished as idiopathic. It is true that in a considerable number of the cases of the latter, the inflammation takes its point of departure from some slight local affection, such as an abrasion or a pimple. The time and the place of the inflammation may be thereby determined, but a sufficiently wide distinction exists between these cases and those in which the disease is to be considered as traumatic.

Traumatic erysipelas belongs in the domain of surgery. It is only when the disease is idiopathic that it falls within the range of medical, as distinguished from surgical, practice. The grounds on which it is included among the essential fevers are the existence of the febrile condition for hours, and sometimes days, before the appearance of the local affection; the localization of the inflammation, in the majority of cases, on the face or head; the disproportion between the increase of temperature, together with other general symptoms, and the local affection, and, in most instances, the evidence of a self-limited duration.

Under the name erysipelatous fever, or, popularly, "the black tongue," a disease prevailed in many parts of this country from 1841 to 1846. Of this disease the author has given a brief account, with bibliographical references, in another work.[1] Erysipelas, however, occurred in only a minority of the cases, whereas, inflammation of the fauces, not infrequently extending to the larynx and bronchial tubes, was a constant affection. Erysipelas occurs occasionally in other fevers, namely, typhus, typhoid, and smallpox. Regarding erysipelas as a special febrile disease, in all these instances, it is fair to assume its existence in combination with the disease in the course of which the erysipelatous inflammation becomes developed.

Irrespective of the occurrence of erysipelas in connection with other diseases, and in hospitals, it is a sporadic disease, having generally a duration of from one to two weeks, and in the great majority of cases ending in recovery. Exceptionally the local affection may continue to wander; relapses may take place, and the duration of the disease be much prolonged. Suppuration and sloughing, also, may delay recovery for an indefinite period.

Prevention of Erysipelatous Fever.

Facts prove that this disease may be communicated. The instances are rare outside of hospitals; but, in view of the existence of a contagium, certain precautionary measures are advisable. These consist of free ventilation of the sick-room, and the disinfection of the bed-clothes and other articles in contact with patients. Patients in hospitals should, if practicable, be isolated. This is the more desirable, because it appears that the contagium is found sometimes to resist the action of ordinary disinfectants. The disease has been communicated by vaccine lymph taken from persons shortly previous to an attack of erysipelas. In hospitals it has been communicated by means of instruments, lint, and other dressings used in the treatment of patients affected with the disease.

Treatment of Erysipelatous Fever.

Exclusive of the local treatment, this fever is to be treated on general principles. It cannot be arrested by any measures as yet ascertained. Full doses of quinia are supposed, in some instances, to abridge its duration. This remedy is indicated as an antipyretic, if the temperature be high. Refrigeration by sponging, or the wet sheet, may also be employed. The mineral acids seem to be useful. Symptomatic indications, which vary in different cases, are to be met as in the treatment of other fevers. Perturbatory measures, and those which diminish the vital powers, are contraindicated. On the other hand, the supporting treatment is to be pursued in proportion as the symptoms denote asthenia, the danger being chiefly in that direction.

---

[1] *Vide* Principles and Practice of Medicine.

Local treatment, with a view to change the character of the inflammation, and to prevent its extension, has proved of no avail. All caustic or irritating applications are contraindicated. Those are to be preferred which, in each case, afford most relief. Sprinkling the inflamed surface with dry powdered starch is sometimes preferable to any moist applications. Covering the surface with a cloth wet with simple water, which may be either warm or cold according to the feelings of the patient, in some cases affords more comfort than the dry powder. There need be no apprehension of a recession of the inflammation.

Pleurisy as a complication when the erysipelas affects the chest, and peritonitis when the affection is seated on the abdomen, have been observed. These complications are, however, extremely rare. If suppuration or gangrene occur, there is a liability to septicæmia. Irrespective of any grave complication, the disease, in the great majority of cases, ends in recovery.

PHARYNGEAL FEVER.

This name, in the absence of any other, may be provisionally applied to an essential fever characterized by pharyngitis. Pharyngitis is common enough as a local affection, accompanied with more or less symptomatic fever. Pharyngeal inflammation is also a characteristic of certain fevers, namely, scarlatina and diphtheria. A fever distinct from these, pharyngitis being a local manifestation, or an anatomical characteristic, occurs as an epidemic disease. A report of such an epidemic which prevailed in the western part of the State of New York, in Pennsylvania, and in Canada, in 1857, was made by Professor Thomas F. Rochester, and by the author. Dr. Harvey E. Brown, of the United States Army, observed a similar epidemic among the troops stationed at Hart's Island, Long Island Sound, in 1866.[1] That this disease was a mild form of the so-called erysipelatous fever which prevailed extensively from 1841 to 1846, is probable. In the 181 cases observed, erysipelas of the face occurred in 7. The duration of the fever is from three to six days. Some swelling of the lymphatic glands of the neck was common, but without suppuration in any instance. Persons of either sex and of all ages were affected. In no instance was the disease fatal.

In the cases under the author's observation, palliative treatment was alone employed. Dr. Brown prescribed, at the outset, a saline cathartic, afterward the liquor ammoniæ acetatis, and the pulvis ipecacuanhæ et opii, with gargles of tannin and capsicum.

---

[1] *Vide* Principles and Practice of Med. by the author.

II.

THE PERIODICAL FEVERS.

INTERMITTENT AND REMITTENT FEVER. TYPHO-MALARIAL FEVER. YELLOW FEVER AND DENGUE.

Of the fevers above-named, intermittent, remittent, and typho-malarial, involve a special cause known as malaria. These are purely malarial fevers, the typho-malarial fever involving, in addition, the special cause of typhoid fever. Yellow fever and dengue are not properly malarial fevers, that is, they are due to other special causes than malaria. They are included in this division, because it is convenient and not inappropriate to consider them in connection with the periodical fevers.

Intermittent Fever.

Intermittent fever (ague and fever) is a malarial disease characterized by a series of febrile paroxysms occurring in a regular order of succession, in other words, the successive paroxysms taking place after uniform intervals, thus exemplifying a law of periodicity. A highly important distinction has reference to the gravity of the disease. In the great majority of cases it is unattended by danger. The disease may be called simple or benign in these cases. It is sometimes attended by great danger, and is then said to be pernicious. Pernicious malarial fever will claim separate consideration, after having considered the usual benign form of the disease. Irrespective of events which give to the disease a pernicious character, the descriptive features relate to the paroxysms and the intervals. The former will be described under the heading, *The Stages of a Paroxysm*. *The Simple Types*, and *The Compound Types*, are headings which will include the important facts relating to the intervals, or the periodicity.

The Stages of a Paroxysm.—A complete paroxysm is composed of three stages, namely, the hot, cold, and sweating. In the cold stage the patient has a distressing sense of chilliness, with, frequently, chattering of the teeth and shiverings. The latter constitute rigor. The surface of the body, especially the extremities and nose, are cold to the touch, but the temperature of the body, taken with the thermometer in either the rectum, mouth, or axilla, is above the normal maximum. The body heat, indeed, rises shortly prior to the manifestations of the cold stage. Lividity of the lips, and at the roots of the nails, is not uncommon in this stage. The duration of this stage varies from a few moments to an hour or two. It is extremely rare for it to be prolonged to several hours. This stage is sometimes wanting, the paroxysm commencing with the hot stage. Other events may be substituted for it, namely, vomiting, gastralgia, somnolency, and, in children, convulsions.

The hot stage is usually developed gradually, but sometimes suddenly.

Heat of the skin, flushing of the face, and the sensation of fever, either follow the symptoms of the cold stage, or occur *ab initio.* The thermometer shows an increase of temperature rarely under 103°, often reaching 104° or 105°, and sometimes exceeding the latter by two, three, or even four degrees. The usual concomitants of high fever are present. The duration of this stage is rarely less than three or four hours, and it may extend to six, eight, or even twelve hours.

The sweating stage commences with a gentle perspiration, which usually becomes profuse. During this stage the temperature falls to the normal range, and all the symptoms of fever disappear. The sweating usually continues for several hours. This stage is sometimes wanting, but the instances are extremely rare.

With the cessation of sweating and complete apyrexia, the paroxysm ends. Then begins the intermission. This term has not the same meaning as the term interval. The latter term embraces the period from the beginning of one, to the beginning of the succeeding, paroxysm. The intermission is the period from the end of one, to the beginning of the next paroxysm. The length of the intermission will, of course, depend on the duration of the paroxysm which precedes it. The duration of a paroxysm varies from four to twelve hours. Exceptionally it may extend to twenty-four hours, or even longer; so that, if paroxysms recur daily, a paroxysm may begin before its predecessor ends.

The Simple Types of Intermittent Fever.—In the vast majority of cases, the paroxysms recur either daily or on every other day, that is, on either the second or the third day; hence the names quotidian and tertian denote these the most frequent types. A rare simple type is the quartan, the successive paroxysms occurring on the fourth day. Cases in which recurrences take place on the fifth, sixth, seventh, or eighth day, constituting a quintan, sextan, septan, or an octan type, have been observed, but so rarely that they are to be regarded in the light of clinical curiosities. The foregoing names of the several simple types imply the reckoning in of the two days on which the successive paroxysms take place. The intermission in the quotidian type may be but a few hours, and, as already stated, one paroxysm may extend into the beginning of another. Usually, in the tertian type, the period of intermission is at least twenty-four hours, and in the quartan type three days. The opportunity of observing a series of paroxysms, unaffected by medical treatment, is now-a-days seldom offered. The recurrence often of paroxysms at precisely the same hour is, however, an established fact. In other respects, as a rule, if paroxysms were allowed to recur without interference, they would resemble each other more or less closely, that is, as regards the presence or absence of the cold stage, the substitution for it of some other event, the duration of the stages respectively, etc. A law of variation, however, in regard to the intervals, is sometimes observed, namely, successive paroxysms occur, each either before or after the hour of the preceding paroxysm, the intervals being shortened or lengthened to the same extent at every successive paroxysm. These are called anticipating or retarding intermittents. For example, a paroxysm of the quotidian type may take place on one day at ten o'clock A. M., and on the following day at half past nine, if anticipating, or at half past ten, if retarding. On the next day the paroxysm recurs at nine or at eleven, and so on. An important fact, with reference to diagnosis, is, that paroxysms of the quotidian or tertian type very rarely occur in the afternoon or early part of the night. The statement by a patient that a paroxysm occurred before midnight is always open to distrust, either as to its occurrence or as to its malarial character.

Compound Types.—Two simple types coexisting constitute a compound type. The compound types are a double quotidian, a double tertian, a duplicated tertian, and a double quartan. Two daily paroxysms occur in the double quotidian type. This is rare, but instances are not extremely infrequent. In the double tertian type a paroxysm occurs daily. The grounds for considering the type a double tertian, and not a quotidian type, are these: The paroxysms on two successive days offer marked differences, for example, in the time of their occurrence, the absence or presence of the cold stage, etc.; but, on comparing the paroxysms which occur on alternate days, they are found to correspond. This is the least infrequent of the compound types. A double quartan exists when a paroxysm occurs on two successive days, and is wanting on the third day. It is said that a triple quartan may occur, that is, a paroxysm taking place daily, the paroxysms on three successive days differing, but each of the three corresponding with the paroxysm which occurs on the subsequent fourth day.

Intermittent fever is easily diagnosticated after a recurrence of well-marked paroxysms sufficient to show the type. A single paroxysm is not always distinguishable from a non-malarial ephemeral fever. Generally the fact of exposure to malaria is known from the patient either living in, or having visited, a malarial district, and having, perhaps, had previous attacks of the disease. It is to be borne in mind that a primary attack may occur many months and perhaps years after the exposure. A chill, followed by fever, sometimes occurs in the early period of phthisis, and may recur daily. In these cases the febrile paroxysm is generally after midday, and there is not complete apyrexia in the intermissions. Moreover, there are pulmonary symptoms and signs sufficient for the diagnosis of phthisis. The chills which are symptomatic of suppurative inflammation rarely follow a law of periodicity, and are seldom unaccompanied by the evidences of an inflammatory affection. In short, the only difficulty in the diagnosis relates to the cases in which it is associated with other diseases, either general or local, and to the irregular forms known as *masked* and *latent* intermittent fever. These forms require distinct notice.

MASKED INTERMITTENT FEVER.

Various functional disorders lasting a brief period, that is, for a few hours, recur in the same order as the paroxysms of intermittent fever. In their recurrence they may exemplify the quotidian, the tertian, or the quartan type. The affection is then said to be a masked intermittent fever. In the great majority of cases, the masking affection is a neuralgia, which is apt to affect one of the branches of the trigeminus, but is sometimes seated in the sciatic or some other nerve. The dependence of the neuralgic attacks in these cases on malaria is further shown by the prompt cure usually effected by the so-called antiperiodic remedies—quinia, etc. The disorders which may give these evidences of a malarial origin are numerous. A periodical recurrence representing any one of the types of intermittent fever, should always lead to the supposition that the latter is masked, and the correctness of this supposition is established if the disorder yield promptly to antiperiodic remedies. The thermometer may show an increase of temperature during the paroxysmal disorder, although other manifestations of fever be wanting. This fact is corroborative of the diagnosis.

Latent Intermittent Fever.

The disease may be called latent when the paroxysms are not recognizable readily by the symptoms of the several stages. This form, together with the form in which the disease is said to be masked, is sometimes popularly known as the "dumb ague." Instances are familiar to all physicians who practise in malarious sections of country. Latent intermittent fever is to be distinguished from the malarial cachexia. Cases of the former occur in which anæmia and other features of the latter are not marked. Close observation will generally discover the evidence of periodicity in certain of the symptoms, and probably, in all cases, thermometric observations will show slight febrile paroxysms recurring in accordance with the quotidian, tertian, or quartan type. The curative effect of antiperiodic remedies establishes the diagnosis.

Prevention of Intermittent Fever.

The most efficient way to prevent intermittent, and also remittent fever, together with other malarial effects, is to extinguish malaria. Means for accomplishing this end efficiently may perhaps be devised after the nature and source of malaria have been demonstrated. In the mean time its production may be lessened by the drainage of malarial marshes, and preventing their inundation, or, if the latter be impracticable, keeping them covered with water. Bringing unimproved land into cultivation tends to diminish malaria.

The selection of a residence, if one be obliged to dwell in a malarial region, is a matter of importance. An elevated site is to be selected at a distance from low or marshy ground and collections of stagnant water. The neighborhood of places in which soil has recently been turned up in making roads, excavations, etc., is to be avoided. Water used for drinking should not come from shallow springs or wells. Persons residing in a malarial situation should not sleep on the ground floor. They should avoid being in the open air in the evening or early in the morning. Any violations of hygienic laws may prove causes accessory to the action of the special cause.

Quinia is undoubtedly an efficient prophylactic. They who are necessarily exposed to malaria, should take daily, especially during the summer months, from five to ten grains. If neither cinchonism nor any inconvenience be occasioned by this remedy, there is no reason to consider its use for an indefinite period productive of any harm. The author has known of repeated instances in which ten grains or more have been taken for several consecutive months without any inconvenience or unpleasant results. The prophylactic efficacy of this drug is applicable to the malarial cachexia as well as to intermittent fever, inclusive of its masked or latent forms.

Treatment of Simple or Benign Intermittent Fever.

Of the different anti-periodic remedies no one is so efficacious as quinia. Whenever available, this remedy is to be preferred to any other, except when persons, from an idiosyncrasy, do not tolerate it in doses sufficient to prevent the paroxysms. The instances in which this degree of tolerance is wanting are very few, if cases of fancied intolerance be excluded. The object of treatment is the speedy prevention of the paroxysms. The notions formerly entertained that the paroxysms should be allowed to recur for a while, and that certain preparatory measures of treatment are to be premised, have happily become obsolete. The disease is self-limited, although its limitations vary very widely in different cases. The disease may end spontaneously with a single paroxysm, or after a few paroxysms; but often, if left to itself, it continues for a considerable period, sooner or later, using a popular expression, "wearing itself out." Inasmuch as each paroxysm is the effect of the morbific action of an internal special cause which ceases to exist or to be operative directly the paroxysm ends, and this cause is reproduced (a new crop of organisms) within the body after the lapse of twenty-four, forty-eight, or seventy-two hours, giving rise to another paroxysm, it seems appropriate enough to consider the successive paroxysms as distinct attacks, the intermissions representing the periods of incubation. Taking this pathological view, it would be proper to call the remedies which prevent the recurrence of the paroxysms, or the renewed attacks, prophylactic, rather than curative.

For the prevention of the paroxysms, in this country the sulphate of quinia is generally preferred. It may be given directly a paroxysm ends, and even during the hot or the sweating stage. The sooner it is given, the greater the probability that the next paroxysm will be prevented. The doses should be sufficient to cause slight cinchonism. The quantity requisite varies considerably in different persons. To determine in each case the tolerance, is, therefore, important in order not to give either too little or too much of the remedy. To an adult, five grains may be given at a dose, and this dose repeated every three or four hours until distinct cinchonism is produced. After this is ascertained, if another paroxysm occur, the quantity to be given before the next paroxysm is expected, may be taken in a single dose, either while a paroxysm is in progress or directly afterward. The quantity to be prescribed, according to this plan, will vary in different cases from ten to thirty grains. This is probably the most effective way of preventing recurrence of the paroxysms. Doses taken shortly before the time when the paroxysm is expected, have but little or no effect in preventing it. The remedy is most effective given in solution, hydrochloric or sulphuric acid being added to increase the solvency. Given in powders, pills, capsules, or wafers, there is risk of its not being dissolved in the alimentary canal, and of its causing gastric disturbance. It is readily absorbed in solution from the rectum, but the doses given by injection should be somewhat greater than those taken into the stomach. It may be given hypodermically. In the treatment of simple intermittents there is so little to be gained by this method, that it is better not to incur the risk of producing suppuration where the injection is made. The advantages of the hypodermic method are, the action is more prompt, and the quantity of the drug required is considerably less than when the remedy is given by either the mouth or rectum. For hypodermic use, Lente's solution is generally employed in Bellevue Hospital. The formula is as follows: Quiniæ bisulph. gr. lxxx; acid. sulph. dilut. q. s.; aquæ font. ℥j. Dissolve by heating, and, after filtration, add acid. carbol. liq. ♏ v. A drachm of this solution contains ten grains of the salt. Bartholow gives the following formula: Quinæ sulph. ʒj; morphiæ sulph. gr. ss; acid. sulph. dil. ♏ xl; aquæ destil. ℥j.—M. Filter.[1] Sixty minims contain seven and a half grains. It is estimated that about one-third of the quantity given by the mouth is equally efficacious if injected beneath the skin.

After the period for the expected paroxysm has passed without its occurrence, the quinia should be continued, but in doses reduced one-half or two-thirds. It is a good precaution to continue its use for several weeks in order to prevent a return of the disease, even if there be no fresh exposure to malaria. As anæmia exists, although the paroxysms may be promptly arrested, a chalybeate tonic should be given, and a generous diet advised, together with, frequently, the moderate use of wine.

The other alkaloids of cinchona are never to be preferred to quinia except on account of cheapness, and a better tolerance in some cases. Following Bartholow, the sulphate of quinidia may be prescribed in the same doses as the sulphate of quinia. It has less bitterness, and is more soluble than the latter. The sulphate of cinchonia has about half the strength of quinia. The same is true of cinchonidia. Chinoidine, or amorphous quinia, in doses twice as large as quinia, is equally effective, as the author can state from his own observations.

Of the remedies which, in the treatment of simple intermittent fever, may be substituted for the alkaloids of cinchona, all are inferior to the latter. They are, however, useful when, from an individual idiosyncrasy, these alkaloids are not well tolerated, and when, as is sometimes, although very rarely, the case, quinia fails to act effectually as an antiperiodic. Hertz cites facts communicated by different observers which appear to show that the eucalyptus globulus is not greatly inferior to quinia as an antiperiodic. He recommends the alcoholic extract made from the fresh leaves.[2] The sulphate of bebeeria has considerable antiperiodic efficacy, although much inferior to quinia. According to Bartholow, hydrastia ranks next to quinia as a remedy for intermittent fever.

[1] Materia Medica and Therapeutics.

[2] *Vide* Ziemssen's Cyclopædia, Am. ed., vol. ii.

Fowler's solution, from six to ten minims three times daily, will generally prevent the recurrence of the paroxysm, but much less promptly than quinia. Salicin is a valuable substitute for quinia in some cases. It may be given to the extent of a drachm daily without any unpleasant effects. These substitutes answer well after the recurrence of the paroxysms has been prevented by quinia. It is hardly to be expected that an antiperiodic remedy superior to quinia will be discovered; but, in view of the limited supply of the cinchona barks, and the consequent cost of their preparations, it is extremely desirable to find other remedies which approach as nearly as possible to these in reliability and efficacy. At the same time, increasing the supply of the cinchona barks is an important desideratum with reference to economy. The remark may be made in this connection, that the imposition of a tax on the importation of cinchona, it is to be hoped, will not long remain a reproach to the government of this country. To inflict on patients with intermittent fever and the other numerous diseases into the treatment of which quinia enters as a remedy for which no equivalent has as yet been discovered, the penalty of taxation on account of their misfortunes, is certainly a cruel act of injustice.[1]

The treatment of a simple or benign paroxysm of intermittent fever requires only palliative measures. The cold stage cannot be cut short or abridged by internal stimulants or external heat. During the hot stage relief is afforded by sponging the body. The sweating stage may be made less uncomfortable by wiping away the perspiration with warm cloths, and changing the body linen. Internal remedies should be avoided lest vomiting be excited, and the stomach be rendered intolerant of the antiperiodic remedy.

REMITTENT FEVER.

The cases of remittent fever, as this disease was formerly described, for the most part are properly cases of typho-malarial fever. Doubtless there are cases of a purely malarial causation, in which remissions occur instead of intermissions. If, however, the fever be purely malarial, recurrences of the remissions are in accordance with the different types of intermittent fever, more especially the quotidian type, and the disease is usually under the control of antiperiodic remedies. Generally, if not invariably, when a remittent becomes a continued fever, and antiperiodic remedies fail to arrest its course, the fever is typho-malarial. This pathological view explains the fact that, in malarial districts, well-marked cases of typhoid fever are rarely observed; and also, the fact that after malarial fevers have disappeared, typhoid fever appears to take their place. Within the author's professional experience, quinia was considered to be contraindicated if there were any fever. This remedy, therefore, was not admissible in the treatment of remittent fever. More than thirty years ago, residing in a malarial district, he began to give quinia in full doses in the remissions, not venturing, at that date, to give it during the febrile exacerbation. He soon found that the disease was often arrested, and when not arrested, it presented the symptoms of continued or typhoid fever. It was formerly the custom to say that a remittent, in certain cases, became converted into a typhoid fever. This was apparently the fact. The true explanation, however, of these cases is, two special causes of disease are acting conjointly, namely, the special cause of typhoid fever and malaria. The conjoined action of these two causes gives rise to typho-malarial fever, which will be considered under a separate heading.

---

[1] Since this was written, the tax has been removed.

A remittent often commences and ends as an intermittent fever. After a few intermissions, perhaps after the second paroxysm, complete apyrexia does not take place, but the fever remits, as shown especially by the thermometer. For a week or longer the remissions continue to recur, and, at length, intermissions follow, preceding convalescence. This was the history of purely malarial remittents prior to their treatment by antiperiodics. With the use of the latter, such cases are comparatively rare. In remittent fever gastric symptoms are apt to be prominent, namely, vomiting, with epigastric tenderness, and a sense of oppression referable to the stomach. These symptoms denote a subacute gastro-duodenitis; and jaundice is produced in some instances by the extension of inflammation into the ductus communis choledochus—hence the name bilious remittent fever. The gastro-duodenal complication, perhaps, explains the occurrence of remissions instead of intermissions, in some instances; in other words, were it not for this complication, the disease would be intermittent fever. Other inflammatory complications of malarial fever may account for the absence of apyrexial periods or intermissions. An herpetic eruption about the mouth is so frequent in cases of remittents and intermittents, and, comparatively, is so rare in other febrile diseases, that it has considerable significance as a diagnostic symptom of malarial fever.

The chief difficulty in the diagnosis of remittent fever is its differentiation from typho-malarial fever. The points involved in this differentiation will be best stated in connection with the latter affection.

The term infantile remittent fever, as heretofore used by writers and practitioners, embraced diseases not attributable to malaria, namely, colo-enteritis and typhoid fever.

In the treatment of remittent fever, antiperiodics are to be employed to prevent the exacerbations, precisely as they are used in intermittent fever to prevent the paroxysms. In addition, symptomatic indications are to be met by appropriate measures.

PERNICIOUS MALARIAL FEVER.

The term pernicious is applied to malarial fever when, deriving from events incident thereto, a gravity not belonging to it in its simple form, it involves more or less danger to life. The events which render the disease pernicious, do not alter its essential pathological character. It is not pernicious in consequence of being complicated with other important affections; it is a purely malarial disease, although, in respect of danger, offering a striking contrast to the benign form. In this respect it may be compared to scarlet fever in its mild and malignant forms. An ordinary malarial fever, like mild scarlatina, involves no danger to life; a pernicious malarial fever, like malignant scarlatina, may be one of the most fatal of diseases, and yet, in both instances, the disease is essentially the same, notwithstanding the contrast as regards gravity. A pernicious malarial fever may be either intermittent or remittent. The former is the more frequent. It is unnecessary to consider each separately.

Pernicious malarial fever is presented under varied aspects, giving rise to different varieties. The most frequent variety is that distinguished as the *comatose*. The patient passes speedily into a condition of coma. The symptoms may be like those of apoplectic coma from active meningeal congestion—the respiration stertorous, the face and head hot, the pupils dilated, etc. Hence, the term *apoplectiform* has been used to distinguish this variety. Or the coma may be less profound, the patient lying in a state of somnolency from which he can be partially roused. After several hours the comatose or somnolent condition may pass off; the intelligence is restored, and there is either apyrexia or a remission of fever, with a notable degree of general prostration. On the other hand, death takes place either during the pernicious paroxysm, or after the duration of coma for several days, the temperature showing quotidian or tertian remissions of fever. There is marked hyperpyrexia during the paroxysm or the exacerbation. Uræmia may be suspected in these cases. It is to be excluded by examining the urine, which, if necessary, should be obtained by means of the catheter, the result of this examination to be taken in connection with the previous history, if this can be ascertained.

Active delirium is the distinguishing feature of another variety. If the paroxysm ends fatally, the delirium usually eventuates in coma.

Another variety is characterized by spasms or convulsions which may simulate tetanus or epilepsy. Symptoms simulating those of hydrophobia have been observed in connection with this *spasmodic* variety.

In the *algid* variety, as it is generally called, the temperature of the body falls below the normal minimum after the hot stage; the skin is either cold and dry, like that of the cadaver, or it is covered by cold perspiration. The pulse is feeble, irregular, and its frequency may be diminished to forty or fifty per minute. The intellect remains intact. The patient is apathetic, and death takes place by asthenia. This variety might appropriately be called *asthenic*.

Vomiting and purging are notable events in a variety distinguished as the *choleraic*. The stools become profuse, watery, and sometimes sanguinolent. Following these are all the symptoms of epidemic cholera—cramps, extinction of the pulse at the wrist, cyanosis, etc. It would be easy to mistake this variety for epidemic cholera at a time when the latter disease was prevalent. The urine, however, is not albuminous, as in true cholera.

An interesting and important variety has, for its distinguishing feature, hemorrhages in different situations, but especially renal. In this country the name *hemorrhagic malarial fever*, proposed by Michel, is generally adopted. It is properly classed among the pernicious varieties, for it is always attended with more or less danger. The hemorrhagic variety occurs chiefly in tropical countries. In the great majority of cases the urine shows the presence of blood or of the blood pigment (hæmaturia, hæmatinuria, hæmaglobinuria). Generally the hemorrhage is exclusively renal, but it may also take place from the stomach, bowels, gums, nostrils, uterus, and blistered surfaces on the skin. It may take place in one or more of these situations without hæmaturia, but the instances are extremely rare. This variety of pernicious malarial fever is not to be confounded with hæmaturia or hæmaglobinuria occurring, irrespective of malarial disease, but having, in certain cases, a paroxysmal or intermittent character. These affections have been noticed in the section devoted to the diseases of the urinary system (*vide* page 407). Nor is it to be confounded with the variety of malarial fever described by M. Bérenger Féraud, under the name *melaneuric bilious fever*, as observed in Africa.[1] In this variety the urine contains bile pigment, but is not bloody.

Hemorrhagic malarial fever has prevailed, more or less, in our Southern States during the last twenty years, a few cases only having been previously reported. The following account of the disease is quoted from a publication by Dr. R. D. Webb, of Alabama: "The phenomena of the disease do not differ materially from those of ordinary intermittent or remittent fever, except in those features connected with its hemorrhagic character, which are not usually manifested until the second, and, occasionally, the third paroxysm or exacerbation. The patient may have an ordinary paroxysm of intermittent or remittent fever, attended, probably, by a greater sense of lassitude and debility than is usual during the intermission, but with nothing to attract special attention or excite alarm. The second paroxysm, or it may be the third, is, however, ushered in by a severe *rigor*, more like that attending a shock to the nervous system, than an ordinary chill. As the rigor passes off, and the febrile stage is commencing, the patient voids his urine, which is found to be deeply colored, the hue being, in bulk, and by reflected light, a dark port-wine color; but when seen in smaller quantity, by transmitted light, a cherry red. Or the chill may be an ordinary one, and in the remittent variety scarcely perceptible, and the passage of the characteristic urine the first symptom to create anxiety in the mind of the patient or among his friends. The urine is passed frequently, and in large quantities, during the continuance of the fever, and it frequently retains its characteristic hue during the remission, though in the intermittents and milder remittents, it usually becomes almost of a natural color, but retains its albuminous character. In from three to six hours after the chill which is followed by this bloody urine, the skin *rapidly* assumes a *bright lemon* yellow color, and in some cases a *bronzed* yellow color. This discoloration, but more of a reddish hue, extends to all the tissues of the body." . . . "The symptoms occur in paroxysms, intermittent or remittent, and the type may be quotidian, tertian, or double tertian." . . . "If the paroxysms are arrested at the second or third return, the patient will soon convalesce, manifesting, however, that the vital powers have been put to a severe test. But if there be failure to arrest the fourth, or at most the fifth, paroxysm, the patient sinks into a state of great debility, or into stupor, and life is soon extinct. This state of debility resembles that following a severe hemorrhage."[1]

---

[1] *Vide* Review in the Am. Jour. of Med. Sciences, Jan. 1875.

Bile pigment is sometimes present, and sometimes absent, in the urine. The dejections are not devoid of the biliary coloration. Dr. Webb is of the opinion that the lemon color of the skin and other tissues is due to hæmatin, and not to biliverdin. With or without bile pigment, the urine contains either morphological blood, that is, blood disks are found, or hæmatin and albumen. The fact of renal hemorrhage is indubitable, and the quantity of blood contained in the urine is sometimes profuse.

The diagnosis of hemorrhagic malarial fever is to be based on the presence of blood or its elements in the urine, or the occurrence of hemorrhage in other situations. The diagnosis is established, provided it be determined that the hemorrhage occurs in connection with either intermittent or remittent fever.

There are few, if any, diseases in the nosology, the prompt diagnosis of which is of greater practical importance than that of pernicious malarial fever. In many cases of disease, delay in the diagnosis does not affect materially the treatment, this being clearly indicated by the symptoms. On the recognition of a pernicious paroxysm or exacerbation, however, the life of the patient is often dependent.

In the vast majority of cases, each of the pernicious varieties is preceded by a single paroxysm, and not infrequently by several paroxysms, of a simple or benign character. This law is of great value in diagnosis. The fact that the events which render an attack pernicious occur at the time when a paroxysm was expected, leads at once to the proper interpretation of the symptoms. It would, of course, be a great advantage were there some circumstances pertaining to the previous paroxysms or the intermissions, which point to the probability of the disease becoming pernicious. There are none to be relied upon. The safest course is to consider, in every case of intermittent or remittent fever, the possibility of the next paroxysm or exacerbation being pernicious. This course is more advisable in warm than in cold or temperate climates, and it is especially to be enjoined whenever cases of pernicious malarial fever have recently occurred.

An examination of the blood may give evidence of a malarial infection, by showing the presence of black pigment granules (melanæmia). This evidence is afforded in some cases of simple intermittent or remittent fever. While in both the simple and the pernicious form the presence of melanæmic granules, taken in connection with the symptoms and history, constitutes strong evidence of malaria, their absence is not proof against the existence of malarial disease. Enlargement of the spleen, this being of frequent occurrence in both forms, is also to be considered in the diagnosis.

The affections for which paroxysms or exacerbations of pernicious malarial fever are liable to be mistaken are to be excluded. These are acute meningitis, meningeal apoplexy, cerebro-spinal meningitis, in the comatose, delirious, and spasmodic varieties; epidemic cholera, and paroxysmal hæmaturia. The algid or asthenic variety can hardly be confounded with any other affection.

---

[1] Hemorrhagic Malarial Fever, by R. D. Webb, Livingston, Ala.

If the pernicious attack do not prove fatal, the diagnosis is established by the disappearance of the dangerous symptoms after several hours. In view of the probability of another attack which will prove fatal, the diagnosis made at this time may be the means of saving the life of the patient.

Treatment of Pernicious Malarial Fever.

It is important that a pernicious attack be at once recognized in order for the employment of measures to carry the patient safely through it. This is the immediate object of the treatment. The indications for this object vary according to the symptoms belonging to the different varieties. In the comatose variety, cold should be applied to the head, and stimulating applications to the extremities. Few, if any, advise blood-letting, even if the face be congested and the action of the heart not enfeebled. If the patient be not feeble, a brisk purgative is admissible, and may prove useful. In a case seen by the author in consultation, the attending physician having been called after coma had taken place, and the diagnosis being impracticable from the absence of any knowledge of the previous history, elaterium was given on the supposition that the coma might be uræmic. The patient emerged from the comatose condition directly the purgative effect was produced. Active purgation might be hazardous in feeble subjects, and it should not be resorted to if the heart's action be weak. Weakness of the heart's action, under any circumstances, is an indication for cardiac stimulants, of which alcohol takes the lead. Hyperpyrexia, as there is reason to believe, is not only a criterion, but a source of danger. Refrigeration by cold sponging of the body may be employed, giving due attention to the effect upon the heart's action. In each variety, except the comatose, opium is indicated. It is useful in relieving restlessness, delirium, and spasm. It is especially to be relied upon in the choleraic variety. It probably tends to shorten the duration of the paroxysm, and it contributes to the tolerance of quinia. The method of administration—that is, whether by the mouth, rectum, or hypodermically—the form of opiate to be selected, the periods of administration, and the doses, are to be determined by circumstances in individual cases. Aside from meeting obvious indications, medicinal treatment should be avoided, lest it do harm by perturbation, or by rendering the stomach intolerant of remedies which are of essential consequence.

The patient having escaped the danger of a pernicious paroxysm or exacerbation, the prevention of another is the object of treatment. The preventive treatment, indeed, should be commenced before the patient fully recovers from the pernicious attack. This is especially important if the type be quotidian, as there is less time for preventive treatment than in the tertian type. For the prevention of another attack, the reliance is upon quinia; and, in order to gain time, this remedy should be given as early as practicable after the safety of the patient during the attack is assured. Distinct cinchonism is to be produced as speedily as possible, and is to be maintained until the period for the next paroxysm has passed. A patient who has passed safely through an attack which has endangered life, will probably die in the next attack. Life, therefore, depends on the success of the preventive treatment. Quinia is to be given in considerably larger doses than are required in simple intermittent or remittent fever. If the stomach be in a condition to tolerate the remedy, twenty grains may be given at a dose, and repeated in two hours. If well-marked cinchonism follow, the intervals may be prolonged to four or six hours, and the dose diminished. It is certainly far better to err in giving too much, rather than too little, of the remedy ; but, it is to be borne in mind, that, given in great excess, it may produce grave toxical effects. In a case which came under the author's observation, one hundred and twenty grains given in twenty-four hours produced complete blindness as well as deafness. These alarming effects, however, passed away after several hours, and the preventive treatment was successful. By pursuing the plan just advised, cinchonism may be produced speedily ; the tolerance of the remedy is ascertained ; and the doses, together with the intervals between them, can be so regulated as to secure the utmost antiperiodic effect without risk of toxical danger. As a rule, opium in some form should be combined with the treatment by quinia, so as to keep the patient moderately under an anodyne influence, avoiding, of course, narcotism. Other remedies given as adjuvants had, in general, better be omitted. The preferable mode of giving quinia is in solution.

If the stomach will not tolerate the requisite doses of quinia, it may be given per enema. As regards doses, the safest course is to give double the quantity which would have been given by the mouth.

The hypodermic method is invaluable if the remedy be not tolerated by either the mouth or the rectum, and when circumstances have prevented its administration until shortly before the time when a recurrence of the attack is to be expected. As remarked by Dr. Webb, the objection to this method—that ulcers or abscesses may be produced at the points where the injections are made—is of little consequence when it is considered that the life of the patient is at stake. The amount given by subcutaneous injection should be sufficient to produce quickly, and to maintain, well-marked cinchonism. These ends will be attained by injecting from five to ten grains; repeating the injection in a couple of hours, and afterward at longer intervals.

At the time when the next attack is to be expected, the patient should remain perfectly quiet, warmth should be applied to the surface of the body, and a full opiate administered.

After the prevention of the recurrence of a pernicious attack, quinia is to be continued for a considerable period, as in cases of simple intermittent fever.

TYPHO-MALARIAL FEVER.

The doctrine that different diseases, each dependent on a distinct special cause, may coexist, forming a compound or hybrid affection, in which the phenomena of the combined diseases are intermingled in varied proportions, is now generally accepted. Of the numerous combinations which may occur, one of the most frequent is exemplified by the affection now known in this country as typho-malarial fever. This term, introduced by Woodward, expresses the combination of typhoid and malarial fever, and nothing beyond this; the name is, therefore, acceptable as regards its significance, and should be adopted.

As already stated, to most of the cases heretofore described as cases of remittent fever, the remissions apparently ceasing, and more or less of the symptoms of the typhoid condition supervening, the name typho-malarial is properly applicable. In the early period of the disease, as a rule, the malarial symptoms predominate. Either intermissions or remissions occur, often observing the quotidian or tertian type. Under the antiperiodic treatment now generally pursued, the paroxysms or exacerbations cease, and the phenomena of typhoid fever are manifest. During convalescence, if antiperiodic remedies be not continued, paroxysms of intermittent fever are apt to occur. In most cases the abdominal symptoms of typhoid fever are present, and the characteristic eruption is not infrequent. Severally and collectively, these symptoms may be absent; but this is true of cases of typhoid fever uncombined with any other affection. The coexisting malarial disease prevents the usual course, especially as denoted by the thermometer, of typhoid fever. If the malarial disease be not controlled, the thermometer, after remissions have apparently ceased, may show oscillations which do not occur in typhoid fever, and which represent quotidian or tertian exacerbations. An herpetic eruption about the mouth is not uncommon.

The diagnosis of typho-malarial fever is to be based on the symptoms of periodic fever at the commencement, and their disappearance under antiperiodic remedies, or, if these be not employed, their continuance in combination with the symptoms of typhoid fever. Of course, the affection occurs only among those who either reside in, or have visited, malarial districts; and the fact of exposure to malaria, if known, is to be taken into account. Stating the problem of diagnosis in another way, in deciding that a case is one of typho-malarial fever, on the one hand a purely remittent, and, on the other hand a purely typhoid fever are to be excluded. The exclusion of each is rarely attended with much difficulty. The former is excluded by the absence of the periodic or malarial features, and the latter by the absence of the enteric and other diagnostic symptoms.

Treatment of Typho-malarial Fever.

Typho-malarial fever is not exempt from the events and circumstances which render, in a certain proportion of cases, typhoid fever, when uncombined, a fatal disease. Very rarely, however, if in any instances, after sufficient time has elapsed for the diagnosis of typho-malarial fever to be made, does the malarial element assume a pernicious character. It remains to be determined, by analyses of recorded cases, to what extent the combination of malarial with typhoid fever, forms an affection more dangerous than the latter. This is an important question, to be settled by clinical experience.

The primary object of treatment relates to the malarial component. This is to be controlled by quinia given precisely as in the treatment of simple remittent fever. The object is to extinguish febrile exacerbations attributable to the malarial fever. To hold this fever in abeyance, is an object of treatment during the entire course of the affection, and, also, in convalescence. The daily thermometric observations, which should be repeated several times in each day, afford evidence of the success of the treatment for this object, as they show, also, the existence and the degree of the malarial exacerbations.

Exclusive of the treatment which may be styled anti-malarial, the indications are essentially the same as in cases of typhoid not associated with malarial disease (*vide* page 687).

Complications and Sequels of Malarial Fevers. Malarial Cachexia.

Anæmia, in a greater or less degree, is constant in cases of malarial fever. This is probably the most important pathological condition in the so-called malarial cachexia. Under the latter name are embraced numerous symptoms, none of which have special diagnostic significance as pointing to malaria, many of them being identical with those which proceed from anæmia irrespective of its causation. The malarial cachexia not only occurs as a concomitant and sequel of the malarial fevers, but it is induced by malaria without either intermittent, remittent, or typho-malarial fever having been developed. In highly malarial districts a considerable portion of the population are cachectic, many of whom may not have had fever of any kind. They are pallid, easily fatigued, low spirited; the appetite is impaired, digestion is disordered, palpitations are common, etc. The evidence that these symptoms proceed from malaria is afforded by the curative effect of quinia, or other anti-malarial remedies, in conjunction with the treatment indicated by the anæmic condition.

Enlargement of the spleen is a not infrequent concomitant and sequel in cases of malarial fever; and it may also accompany the malarial cachexia when this exists without the periodic fevers having been developed. Quinia or other anti-malarial remedies and chalybeates, together with hygienic measures for the removal of the cachexia, constitute the treatment indicated in the cases in which this complication occurs.

General dropsy is sometimes a sequel of long-continued or frequently recurring attacks of periodic fever, together with the malarial cachexia existing in a marked degree. In determining that the dropsy is due to the effects of malaria, renal and cardiac disease are to be excluded. Excluding disease of these organs, recovery is to be expected under the treatment indicated by the malarial cachexia. It may be doubted if hydroperitoneum, without general dropsy, be ever caused by hepatic changes attributable to malaria.

Whenever practicable, it is advisable for patients affected with the malarial cachexia to remove from districts in which malaria is rife, during the season when this special cause of disease is produced.

A fact highly important in its practicable bearings, is the frequent concurrence of malarial fever with other affections, either local or general, in malarial districts. Malarial fever may be combined, not only with typhoid fever, but with any disease. The recognition of a malarial element in different affections, is essential to appropriate treatment. In general terms, the existence of this element, and the degree of its morbific influence, are to be determined by a febrile temperature exceeding that which would be expected were the affection uncomplicated, and the occurrence of exacerbations of fever in accordance with the types of periodic fever. As a rule with few, if any, exceptions, whenever an affection is either complicated with intermittent fever, or shows the existence of a malarial element, anti-periodic remedies are at once indicated. These are to be given in sufficient doses, and continued sufficiently to extinguish and keep in abeyance the pathological effects of malaria.

Persons suffering from the malarial cachexia are not only liable to the development of periodic fever, as a complication of different affections, but the ability to tolerate and recuperate from these, is impaired. Treatment having reference to the cachectic condition is to be pursued in connection with the therapeutical measures indicated by the different affections.

YELLOW FEVER.

Yellow fever in this country is an epidemic disease. It is a fever having a duration of from one to three or four days. In mild cases it presents nothing very distinctive, and convalescence takes place without any untoward symptoms. Grave events, however, frequently either take place toward the end of the fever, or, oftener, follow it after a period varying from a few hours to two days. These events are gastric hemorrhage giving rise to the "black vomit," hemorrhage in other situations, and suppression of urine. Yellowness of the skin occurs frequently, whence the name of the disease. The fever ends, in some instances, in complete apyrexia, and in other instances the defervescence is not complete, the temperature notably falling, but not to the normal standard. A secondary fever, more or less intense, occurs in a certain proportion of cases.

In the foregoing sketch it is assumed that the events distinctive of this disease in its severe forms are to be regarded as sequels of the fever. This view is more simple, and seems more appropriate, than to divide the disease into three stages. If such a division be made, the second stage is the apyrexia, the remission, or "the state of calm," immediately following the fever; and the third stage is that in which the yellowness, black vomit, and uræmic symptoms generally occur. In mild cases there is no room for the second and the third stage; convalescence follows the first stage.

In mild cases, yellow fever, except when the disease is prevalent, could not easily be distinguished from ephemeral fever or febricula. Some cases are so trivial that patients do not take to the bed. It is difficult to appreciate the fact that, in these cases, the disease is yellow fever; but evidence of its being the disease is afforded by subsequent insusceptibility to the special cause. These mild cases afford occasion for doubt and differences of opinion, as to the diagnosis, before the establishment of an epidemic.

Cases well marked and more or less severe, offer the following characters: The invasion is oftener sudden than gradual, and, if preceded by prodromes, these have nothing distinctive. The fever heat rises rapidly, and quickly attains to the maximum which varies from 102° to 110°.[1] The patient complains of severe headache, with pain in the back and limbs. As regards these symptoms, the disease resembles relapsing fever. The eyes are watery, slightly injected, and glistening. The pulse is frequent. There is nausea at the commencement, sometimes ending in vomiting of ingesta and bile. The bowels are constipated.

It is impossible to foretell from any of these characters whether or not the fever will be followed by grave sequels. The latter occur sometimes when patients keep about their ordinary avocations during the course of the fever. These cases, in this country, go by the name "walking cases."

The sequels of the fever constitute the most distinctive characters of the disease. These occur within forty-eight hours; sometimes very shortly after the complete or partial defervescence, and in some instances prior to the latter. The black vomit is preceded often by the vomiting of a clear acid liquid which is called the "white vomit." Tenderness over the epigastrium is marked. Enterorrhagia is apt to follow the gastrorrhagia. Hemorrhage may occur in other situations without taking place from the alimentary canal, namely, from the mouth, nose, vagina, eyes, ears, and accidental wounds or abrasions. It very rarely takes place from the urinary passages. Profuse hemorrhage in these various situations is always an event of grave omen; and the black vomit is almost a fatal prognostic. The icterode color of the skin, although not in itself a source of danger, is a symptom denoting gravity of the disease. It occurs, however, in cases which end in recovery. In most of the cases in which death is not due to asthenia from the loss of blood, it is attributable to uræmia. The suppression of urine gives rise to uræmic coma, sometimes delirium, and, in some cases, convulsions. Before suppression, the urine is frequently found to contain albumen.

Exclusive of the mild cases, or those in which the characteristic sequels do not follow, occurring sporadically or as the forerunners of an epidemic, the diagnosis of yellow fever is readily made. From remittent fever it differs in the absence of remissions, or the oscillations of temperature, which distinguish that disease. It is not arrested by full doses of quinia. It may prevail in places where malarial fevers are not produced. Enlargement of the spleen, which is common in the latter, never occurs in yellow fever. It has certain symptoms in common with relapsing fever. The occasion for a differentiation from the latter could only occur when an epidemic of each prevailed coincidentally—an event not likely to happen in this country. The hæmaturic form of a pernicious intermittent, like the other forms, is preceded by one or more of benign paroxysms; moreover, hæmaturia is of very rare occurrence in yellow fever. It is unnecessary to consider the differential diagnosis with more detail. In none of the affections just mentioned, nor in connection with any other fever, do the grave events, or sequels, which characterize yellow fever, occur. During an epidemic, the cases, without these events, presenting a short febrile career, with no marked exacerbations—cephalalgia, rachialgia, muscular pains, and gastric irritability being prominent symptoms—may without hesitation be pronounced cases of yellow fever. It is only in cases of a very brief, slight fever that there is room for doubt. The importance of the diagnosis in the latter cases, has reference to subsequent immunity from the disease, which is secured by the mildest as well as by the severe forms of the disease. It is, however, to be borne in mind that the grave events of the disease may follow notwithstanding the mildness of the fever. Observations have shown that yellow fever and malarial fever may be combined. Under these circumstances there may not be that persistent febrile temperature, with little or no variation, which is typical of the former; but this combination does not affect the liability to the occurrence of the characteristic sequels.

---

[1] Observations by Joseph Jones, M.D., *vide* Boston Med. and Surg. Journal, August, 1873. Cited in Nouveau Dictionnaire de Médecine et de Chirurgie.

Prevention of Yellow Fever.

Underlying preventive measures, are certain facts respecting the etiology of this disease. That it involves a special cause cannot be doubted. It is convenient to designate this cause as consisting of yellow fever germs. The disease cannot be developed without the presence of these germs. The germs are never reproduced within the body; a contagium, therefore, does not enter into the etiology. Adopting the terms used by recent German writers, yellow fever is a miasmatic infectious disease. The germs may be transported from place to place by clothing, merchandise, vessels, etc. The disease is therefore portable, although not communicable or contagious. The multiplication of the germs outside of the body requires certain conditions. One of these is an annual average temperature (72° to 77°) pertaining to certain zones, namely, between 43° N. and 33° S. latitude in the Western, and between 42° N. and 8° S. in the Eastern Hemisphere.[1] In the yellow fever zones, the germs are reproduced only during the hot months of the year. They are either destroyed or rendered inactive by frost. Unsanitary conditions relating to sewage, overcrowding, collections of filth, etc., are efficient, if not essential, auxiliary causes, either promoting the multiplication of the germs, or rendering the system more susceptible to their morbific agency.

Preventive measures are to be based on these facts. During the hot months, communications with places, domestic or foreign, in which the disease prevails, should be subjected to quarantine restrictions. Ships and their cargoes, before entering port, should be thoroughly disinfected. Patients ill with the disease should be removed to hospitals. There is no necessity for detaining in quarantine the passengers or crews, provided their clothing and baggage be disinfected; "Man's agency is not as a producer, but only as a carrier of the infectious material, just as is the case of the cargo of a ship, its bilge-water, and the ship itself." As far as practicable, merchandise, baggage, etc., from infected places, by other than water routes, should be detained until disinfected. It still remains to be demonstrated whether, in place of the usual disinfecting agents—chlorine, carbolic acid, sulphur fumigations, etc.—cold artificially produced, and carried below the freezing point, may not destroy the germs. Barallier suggests the propriety of employing colored laborers in discharging the cargoes of infected vessels, and performing the duties connected with disinfection, in view of the fact that the negro race is comparatively insusceptible to the special cause of the disease. Hygienic regulations involving the removal of all unsanitary conditions constitute important preventive measures. The measures should embrace personal as well as public hygiene. It is a question not yet settled whether this disease may not be "stamped out," by promptly and efficiently disinfecting every house, and its surroundings, in which cases occur. It may be doubted whether this plan of disinfection has ever been carried out with sufficient thoroughness to test fully its efficacy in preventing the diffusion of the disease. As a model for its thorough execution, reference may be made to the measures pursued by the New York Board of Health in 1866 for preventing the diffusion of epidemic cholera. These will be stated in connection with the latter disease. To prevent exposure to the special cause of yellow fever, unacclimated inhabitants of places in which the disease exists as an epidemic, should, if practicable, at once remove to situations beyond its reach, not returning until the epidemic has ceased. Immunity from the disease, as a rule, to which there are some exceptions, is secured by having once experienced it in ever so mild a form. Natives, and they who have resided for a considerable period in places where epidemics have occurred, become acclimated, although never experiencing the disease. Acclimation, however, does not secure complete immunity. It happens not infrequently that persons who have passed through several epidemics without having the disease, at length become its victims. The protection afforded by an acclimation acquired by long residence in a yellow fever zone, may be lost by a considerable period of non-residence; on returning, persons not infrequently become affected with the disease.

---

[1] *Vide* Haenish, Ziemssen's Cyclopædia, Am. ed., vol. i.

Treatment of Yellow Fever.

The variations in the rate of mortality from this disease in different epidemics, and in different periods during the continuance of an epidemic, are such (10 to 75 per cent.) that it is not easy to test the relative merits of different methods of treatment by comparing the proportion of fatal cases. Like scarlatina, different cases of yellow fever represent one of the mildest and one of the gravest of diseases; hence, from the treatment of the former, no inferences can be drawn as respects the latter. In mild cases the disease intrinsically tends to recovery; in grave cases a fatal termination is often inevitable. The termination in either death or convalescence, in the majority of cases, is within a week. In the shortness of duration, it is only equalled by puerperal fever, epidemic cholera, cerebro-spinal meningitis, and pernicious intermittents.

We have no knowledge of any remedy which will control this disease as quinia controls malarial fevers. The treatment must, therefore, be symptomatic and expectant. The rational indications relate to irritability of the stomach, hemorrhages, suppression of urine, hyperpyrexia, and weakness of the heart's action. To arrest and prevent vomiting is important, as, perhaps, protective against gastric hemorrhage (black vomit). Great care as regards ingesta is requisite. Milk, with lime-water added, is probably the most eligible article of diet. The inquiry arises if it be not advisable to nourish chiefly or exclusively by rectal alimentation. Remedies likely to excite vomiting should be avoided. If vomiting of blood occur, ice in small pieces may be swallowed, and cold applied over the epigastrium. Subcutaneous injections of morphia are indicated by this event. With a view to the arrest of gastrorrhagia and hemorrhage in other situations, ergot should be tried. The aqueous solution (ergotine) should be used hypodermically. Local styptics are to be employed when the hemorrhage takes place in parts to which they can be applied. To ward off the danger incident to the deficient or suspended action of the kidneys, is a highly important object of treatment. The attempt to do this by diuretics would be futile; nor is it ever advisable to resort to hydragogues. To promote vicarious elimination by the skin is, therefore, the only resource. Perspiration may be produced by hot air introduced under the bedclothes, and by hot aromatic drinks if the stomach be not irritable. The cautious trial of jaborandi, sufficiently to test its safety and utility, is a desideratum. Sponging of the body as an antipyretic measure is indicated if the temperature rise to 103° and upward, provided the measure does not conflict with other indications, namely, the elimination of urea by the skin, and sustaining the force of the heart's action. A full dose of quinia may be given as an antipyretic. It is to be determined by clinical experience how much benefit is to be derived from reduction of the febrile heat during the course of the fever. Alcoholics are undoubtedly indicated by feebleness of the heart's action. The author is cognizant of cases in which apparently they were the means of saving life. If taken into the stomach, champagne wine has been found especially suited to cases of this disease. If it be considered injudicious to give alcoholics by the mouth, they may be given by injection or hypodermically. Some form of spirit should then be used.

Absolute quiet is an essential part of the treatment. Everything perturbatory or depressing is contraindicated. Perhaps in no other disease are these injunctions to be impressed more forcibly than in yellow fever. It is questionable whether it be judicious, as is generally recommended, to move the bowels at the outset with an efficient cathartic. This is not indicated unless there be evidence of constipation; and, if simple enemas suffice, they are to be preferred. Pain in the back and limbs is to be palliated by opiates.

Convalescence after a severe attack of yellow fever is slow, and there are present the indications for tonic remedies, which should include iron, a nutritious alimentation, the moderate use of wine, and invigorating measures of hygiene.

After the date of the infection, the disease, in the great majority of cases, is developed in from three to seven days. Non-infection cannot be positively inferred until after a longer time. It is stated that the period of incubation is sometimes extended to weeks and months. Such instances are open to doubt.

DENGUE.

Dengue, popularly known in this country by the name "break-bone fever," has certain striking characters, and is undoubtedly a distinct species of fever. It bears, in certain respects, a resemblance to rheumatic, yellow, and relapsing fever; but its non-identity with either of these affections is sufficiently clear, and the points involved in the differential diagnosis are well marked. It is a disease of hot climates, and occurs almost exclusively as an epidemic, sporadic cases being extremely rare. Epidemics have occurred repeatedly in different parts of the Southern States of the Union since 1828. The following summary of the clinical history will embrace its diagnostic features: The invasion is abrupt in the larger proportion of cases. When gradually developed, there are prodromic symptoms from one day to three days; but they are not distinctive of the disease. After the commencement of fever, the axillary temperature rapidly rises, reaching quickly its maximum, which is often 105°, and not infrequently 106° or 107°. A continuous high fever lasts, in some cases, for only a few hours, and in other cases for two or three days. Exceptionally the fever continues for a week. The temperature falls as rapidly as it rose, and the defervescence is often accompanied by profuse sweating. During the febrile career, the pulse is notably frequent, varying from 120 to 140, the frequency of the respirations being in proportion. A burning heat of the skin is perceptible to the touch. The patient complains of pains referable to the head, eyes, back, and limbs. More or less of the joints are frequently swollen, reddened, painful, and tender. The name "break-bone" derives its significance from the character and intensity of these pains. The peculiar gait, when the patient attempts to walk, led to the name dengue, which is synonymous with "dandy." Frequent and rapid changes in the situations of the muscular and arthritic pains, constitute a striking feature. The fever, in many cases, does not end in complete apyrexia, the temperature remaining a little above the normal range, and after a few days there is often a second febrile attack, the fever being less intense than in the first, and gradually declining after a few days. At or near the commencement of the primary attack, a fugitive rash may appear in certain parts, and sometimes over the whole body. This disappears in the course of twenty-four hours, and after the primary attack an eruption occurs in the larger proportion of cases. The eruption is not uniform in different cases. It is sometimes an efflorescence, resembling that of scarlatina or roseola; it is sometimes papular, having a resemblance to either rubeola, lichen, or urticaria, and in rare instances it is vesicular. Itching often accompanies the eruption. Desquamation of the cuticle is sometimes a sequel. The duration of the eruption varies from a few hours to several days. Purpuric spots are occasionally present. The Schneiderian membrane is sometimes affected, as in measles, and, in some instances, the fauces are reddened, also enlargement of the cervical glands taking place, as in scarlatina. Convalescence is apt to be slow. Relapses are not rare. Age and sex furnish no exemption from the liability to the disease. The joints remain affected for some time after the fever has ceased. Diarrhœa, boils, and abscesses, are occasional sequels.

Epidemics of dengue are often remarkable for the large number of persons simultaneously affected by the disease. Almost the entire population of a place may be at one time suffering from it. Prevailing as an epidemic, physicians are not troubled with doubts as regards the diagnosis. It resembles acute articular rheumatism only in arthritic symptoms—swelling, tenderness, and redness—and these are not invariably present, the pains existing without their occurrence. It never presents the grave characteristic events of yellow fever, namely, black vomit, dangerous hemorrhages, elsewhere than in the stomach, and suppression of urine. Yellowness of the skin is not a symptom. The disease is almost never fatal. It resembles relapsing fever more closely than any other affection. The latter is diffused by a contagium, while the communicability of dengue is doubtful. Relapsing fever may prevail in any climate, whereas dengue is confined to the tropics. It can hardly be confounded with malarial fever.

Prophylaxis and Treatment of Dengue.

An exemption from a renewed infection appears to exist for some years after the disease has been once experienced. For others, there are no known means of prevention except removal beyond the area of the epidemic.

A controlling remedy is not yet discovered. Dr. Charles, of Calcutta, is of the opinion that the disease may be marvellously shortened, and its intensity lessened by the use of belladonna in moderate doses. The severity of the pains calls for opiates. Sponging of the body with cold water is indicated by hyperpyrexia. In other regards, symptomatic indications are to be followed.

III.

THE ERUPTIVE FEVERS.

VARIOLA OR SMALLPOX. RUBEOLA OR MEASLES. SCARLATINA OR SCARLET FEVER. VARICELLA OR CHICKEN-POX. VACCINIA OR COW-POX. RÖTHELN OR GERMAN MEASLES. ROSEOLA OR ROSE-RASH.

THE eruptive or exanthematous fevers are those in which an eruption is an almost constant and a prominent feature. The eruption in each is distinguished by peculiarities relating to its physical characters, together with the laws governing its development, diffusion, continuance, and disappearance. The eruptions in typhus and typhoid fever, and in dengue, are not as constant nor as prominent features. In other respects they are of less importance than in the clinical history of the eruptive fevers. The propriety of separating the latter, and placing them in a distinct class, rests on the facts just stated.

The eruptive fevers may be coincident with other diseases, and they are sometimes found in combination, two distinct species coexisting. This fact is to be borne in mind with reference to diagnosis, prognosis, and treatment. A late writer, Bez, collected from various sources 68 cases of scarlet fever and measles in combination; 51 cases of smallpox and scarlet fever; 37 cases of smallpox and measles; 16 cases of varicella and measles; 13 cases of varicella and scarlet fever; and 22 cases of typhoid fever with which some one of the eruptive fevers coexisted.[1]

Of the fevers of this class, variola or smallpox, rubeola (morbilli) or measles, scarlatina or scarlet fever, are the most important in respect of frequent intensity of disease, and danger to life. With reference to diagnostic characters, anomalies, complications, and sequels, these three fevers will be considered collectively, as forming a separate group. Next, the eruptive fevers of lesser relative importance will be considered, namely, vaccinia or cow-pox, varicella or chicken-pox, rötheln or German measles, and roseola or rose-rash. Afterward, the prevention and the treatment of smallpox, measles, and scarlet fever will be treated of under distinct headings.

Diagnostic Characters of Smallpox, Measles and Scarlet Fever.

The diagnostic characters of these eruptive fevers pertain to, first, the time after the reception of the special cause (which in each of the fevers is a contagium), and the first symptoms of disease, that is, the period of incubation; second, the stage of invasion, or the period from the first symptoms of disease to the appearance of the eruption; third, the stage of the eruption, or the time during which the eruption continues; and fourth, the stage of desiccation, desquamation, or that following the disappearance of the eruption.

Incubation.

The duration of the period of incubation, when the date of exposure to the contagium is known, is of some value in an early diagnosis, but the importance is chiefly in deciding that the time for the development of the disease has passed.

The average duration in SMALLPOX, when produced by an infectious miasm, is about twelve days. The extreme limits are five and twenty days. The duration is shorter when the disease is produced by inoculation, namely, seven or eight days. The latter fact is of importance when it is desired, by inoculation, to anticipate the development of the disease from miasmatic infection.

---

[1] De la contemporanéité des fièvres éruptive et de leur coexistence avec la fièvre typhoide chez le même individu. *Vide* analytical review in Jahresbericht uber die Leistungen und Fortschritte in der Gesammten Medicin, Von Rud. Virchow und Aug. Hirsch, Berlin, 1877.

In MEASLES the average duration is somewhat shorter than in smallpox. It may be stated to be from six to ten days. Not infrequently it extends to fourteen days. In exceptional instances it may be considerably shorter or longer than the average, the extreme limits not having been exactly ascertained.

SCARLET FEVER is developed after a shorter period of incubation than measles. The average duration is from three to five days. The author has met with a case in which the date of exposure was forty-eight, and a case in which it was but twenty-four hours prior to the development.

Not very infrequently the duration is from six to eight days, and in rare instances it may extend to twelve or fourteen days. The duration is more variable than in the other eruptive fevers.

Stage of Invasion.

The duration of this stage is subject to but little variation in each of the three fevers, and it has considerable weight in the differential diagnosis before the characters of the eruption are manifest. The eruption in *smallpox* appears two or three days from the date of the first symptoms of illness; the appearance in *measles* is after four or five days, and in *scarlet fever* after a single day.

The invasion in *smallpox* takes place usually with a chill or a series of chills, not infrequently accompanied by rigor. The temperature rises rapidly, with slight variation in the morning and evening. A temperature of 105° is not uncommon, and it may rise one or two degrees higher. The frequency of the pulse usually corresponds to the degree of fever heat. Headache is usually intense, and pain in the back is so marked as to have considerable diagnostic significance. Delirium occurs in some instances; occasionally notable somnolency, or even coma, and in children convulsions are not very rare. Nausea and vomiting, with epigastric tenderness, are symptoms constant and more or less marked.

An occasional event in this stage is an efflorescence sometimes diffused and sometimes in patches, scarlatinous in appearance, so that the disease is liable to be mistaken for scarlet fever. The fauces at the same time are sometimes reddened, and this increases the liability to the mistake. Petechial spots sometimes precede the eruption characteristic of the disease. The whole surface of the body may be thickly studded with them. The scarlatiniform efflorescence and the petechial may be combined. It is important to bear in mind the occasional occurrence of these eruptions in smallpox during the stage of invasion. Coryza and subacute laryngitis sometimes occur, and these events may mislead by appearing to indicate measles. Notable pyrexia following immediately a chill, the fever continuing, without much remission, for two days, lumbar pain being a prominent symptom, if it be known that the patient has been exposed to the contagion of smallpox, or if this disease be prevalent, renders the diagnosis extremely probable.

The invasion in *measles* is rarely accompanied by a distinct chill. Fever occurs rather suddenly, with coryza and often the symptoms of bronchitis. The eyes are reddened and watery; the voice is often hoarse, showing subacute laryngitis, and not infrequently the fauces are reddened. The fever continues for one or two days, the temperature ranging from 102° to 104°, when a considerable remission, or sometimes complete apyrexia, takes place. Epistaxis is not uncommon. The local and general symptoms sometimes have so little intensity that patients do not take to the bed. In general, the fever and other constitutional symptoms are greater than would accompany the affection of the air passages were it purely local. This fact should lead to a probable diagnosis of measles, if they be prevalent, and influenza be excluded.

The invasion in *scarlet fever* is usually sudden, a chill occurring in only a certain proportion of cases. In children, vomiting is a very common symptom at the outset. Fever more or less intense is rapidly developed. The temperature may rise at once to 105° or higher. The frequency of the pulse corresponds to the intensity of the fever. Restlessness, headache, sometimes delirium, and general malaise are marked if there be notable pyrexia. In mild cases all these symptoms may be slight. In connection with the symptoms just named, in the great majority of cases the fauces present the appearance of erythematous inflammation. The latter associated with suddenly developed high fever and vomiting, points to scarlet fever, especially in a child, and if the disease be prevalent. In mild cases even a probable diagnosis can hardly be made prior to the stage of the eruption.

Stage of Eruption.

The diagnostic characters in this stage are derived from the appearances of the eruptions, their diffusion over the body, and their changes, together with the associated general and local symptoms. It is now assumed that the fevers pursue their usual or typical course, the variations belonging to anomalies or irregular forms, and those caused by complications, being reserved for separate consideration.

In *smallpox* the eruption first appears on the face, especially about the mouth and chin, appearing nearly at the same time on the wrists and forearms. It is not until the second or third day that diffusion takes place over the trunk and lower extremities. The series of changes which occur are always most advanced in the situations where the eruption commenced. This series is characteristic. The eruption at first consists of red spots not much larger than a pin's head. It is then maculated. In from twelve to twenty-four hours an elevation is perceptible to the touch. The maculated has become a papular eruption. On the third day vesicles on the top of the papules are appreciable. The eruption is now vesicular. As soon as vesicles are apparent, an indentation at the summit of some of them is perceptible. This appearance is distinctive, and should be sought after with the aid of a magnifying glass if required. The vesicles increase in size, and on the fourth or fifth day of the stage of the eruption they have attained to the size of a split pea. The central depression in more or less of the vesicles is now a marked feature, giving rise to what is known as the umbilicated appearance. The liquid contents of the vesicles are opaline. On the sixth or seventh day the contents of the vesicles are purulent; in other words, the vesicles have changed to pustules. This account supposes the eruption to be discrete. In cases distinguished as cases of confluent smallpox, the maculæ and papules are so abundant as to be in juxtaposition; and when vesicles form, they coalesce, forming blebs or blisters of greater or less size. The eruption not infrequently is confluent on the face and extremities, while it is discrete over the trunk. Without considering confluent smallpox separately, it suffices to say that it is a much more severe form of the disease than when the eruption is discrete.

The errors in diagnosis, as regards the characters of the eruption, are in mistaking smallpox for measles, and for varicella. Before the papules change to vesicles, there is a resemblance to the eruption in measles. The papules, however, are smaller, rounder, and harder to the touch than those of the latter disease. It is a good illustration to compare the feeling to that of small shot under the skin. The mistake of confounding the disease with varicella, relates chiefly to the modified form of smallpox, commonly called varioloid. Both varioloid and varicella will be considered under separate headings, the former among the irregular forms of smallpox.

Simultaneously with the appearance on the skin, the eruption, in most cases of smallpox, appears within the mouth and fauces. On a mucous surface it has the appearance of small, round ash-colored spots, each with a reddened areola. They are especially apt to appear on the soft palate and tonsils, but sometimes on the inner surface of the cheeks and lips, also on the tongue and within the nose. More rarely they appear within the prepuce, vulva, and anus. Their occasional appearance in the larynx and on the conjunctiva may give rise to important complications. Appearing on a mucous surface in situations where they can be seen, they serve to establish the diagnosis based on the cutaneous eruption.

It is unnecessary, with reference to the discrimination of the disease, to describe the appearances of the face, trunk, and limbs, when the eruption has reached its acme, and, also, during the stage of desiccation, for, if cases are under observation prior to these periods, the diagnosis has been already made, and in cases which are seen for the first time at these periods, the disease is recognized at a glance.

A diagnostic feature of smallpox at the commencement of the stage of the eruption, is a notable remission of fever, the temperature falling sometimes nearly or quite to within the limits of health. Assuming that no inflammatory complication exists, the degree of the remission affords evidence that the eruption will be either discrete or confluent; the latter if the remission be slight, and if it be marked the former. During the remission there is more or less mitigation of the symptoms which accompanied the pyrexia during the stage of invasion. The temperature gradually rises until the eruption becomes pustular, when there is a notable increase, constituting the suppurative fever, the fever of maturation or the secondary fever. According to the severity of the disease, the temperature varies from 102° to 104°. The usual concomitants of high fever return. In severe cases, there is often delirium which is sometimes active and sometimes passive. With the latter, other symptoms denoting a typhoid state are associated.

In the majority of fatal cases, death takes place in the stage of the eruption.

In *measles* the eruption first appears on the forehead and temples. It extends over the face and neck within a few hours; but its extension over the trunk and lower extremities is slow as compared with the other two eruptive fevers. The general diffusion occupies thirty-six or forty-eight hours. Appearing first as maculæ or spots, these soon become slightly elevated, forming papules which, when discrete, tend to arrange themselves in crescentic forms. The papules by coalescence often form patches of greater or less size, and more or less numerous, the intervening portion of the skin preserving its normal color. In some instances the eruption is universally confluent. The borders of the patches are crescentic or curvilinear. The papules differ from those of smallpox in being somewhat larger and softer. The color is deep or dusky red, which, as a rule, momentarily disappears on pressure. If the eruption be abundant, the integument is somewhat swelled. This is very apparent on the face.

The pyrexia increases with the development of the eruption, the temperature rising to 103°, 104°, or 105°, and sometimes higher; and it declines rapidly, if there be no complication, when the eruption begins to fade. The inflammation affecting the air passages diminishes notably, as a rule, before the fading of the eruption. The latter event denotes the ending of the stage of the eruption, the average duration of which is about four days.

In *scarlet fever* the efflorescence appears usually on the neck and chest simultaneously with its appearance on the face. In the latter situation it appears on the cheeks and temples, leaving the skin unaffected around the mouth. It extends rapidly over the trunk and extremities, in this respect differing from the eruption in smallpox and measles. The general diffusion takes place usually within twenty-four hours. Instances in which it appears on the trunk and limbs before its appearance on the face and neck, are not extremely rare. It is at first in the form of minute spots. These by coalescence form patches variable as regards number and size, or the whole body may be covered with an efflorescence, when the surface resembles the shell of a boiled lobster. The patches have irregular or serrated borders. The color is a bright red; hence, the name scarlet fever. The patches of efflorescence show, on close observation, numerous points of a deeper color, which are the sites of the primary discrete maculæ.

The eruption disappears usually within three or four days. The duration of the stage of the eruption, however, is not very rarely considerably longer; it may extend even to the fourteenth day. Miliary vesicles are not uncommon.

The affection of the fauces continues. The tonsils are generally more or less enlarged, and the mucous surface may be coated with a muco-purulent, or a pultaceous matter, the latter resembling an exudation. A true diphtheritic exudation sometimes occurs. With these appearances within the throat, the submaxillary and lymphatic glands at the angle of the jaw are enlarged.

The tongue in some cases presents an appearance which is highly diagnostic. The papillæ are enlarged, and, if the surface of the organ be coated, they project through the coating, and present an appearance as if the surface had been sprinkled with Cayenne pepper. If not coated, the appearance of the tongue is still more characteristic. It resembles closely a ripe strawberry, and is commonly known as the strawberry tongue. The appearance is peculiar to this disease, and the diagnosis might almost be based upon it alone.

Pyrexia, more or less intense, continues through this stage, gradual defervescence in favorable cases commencing at its close. The degree of fever is generally a criterion of the severity of the disease. In severe cases, delirium is common, and is active, patients requiring to be watched or restrained, in order to prevent their escaping out of doors, and sometimes jumping from windows.

Desiccation or Desquamation.

Patients sometimes are not seen by the physician prior to this stage. The diagnosis is then to be based on the appearances and symptoms, taken in connection with the facts which can be ascertained respecting the preceding clinical history.

In *smallpox*, the incrustations and scabs resulting from desiccation of the contents of the ruptured pustules, form a picture which can hardly be mistaken.

In *measles* there is usually more or less of the furfuraceous or branny desquamation of the cuticle. Bronchial cough, expectoration, and hoarseness from laryngitis generally continue into this stage.

In *scarlet fever* desquamation is the rule with some exceptions. It may be furfuraceous, but it is oftener lamellar, that is, the cuticle is exfoliated entire in portions of greater or less size. The cuticle of the hands may sometimes be removed intact, peeling off like a glove. Desquamation may take place when the eruption had been wanting. The author has met with an example. A secondary efflorescence not infrequently takes place in the stage of desquamation, and a second desquamation, without a renewal of the efflorescence, sometimes occurs.

The foregoing account of the diagnostic characters relating to the several stages of smallpox, measles, and scarlet fever, applies to cases in which these diseases pursue a regular or typical course. Each is liable to anomalies or irregular forms, to complications, and to sequels, which are to be taken into account as regards diagnosis, prognosis, and treatment.

ANOMALIES OR IRREGULAR FORMS, COMPLICATIONS AND SEQUELS OF SMALLPOX.

In the majority of the cases of smallpox seen at the present day, at least in this country, the disease presents the anomalies or irregular forms which are embraced under the name *varioloid*. This term implies a pathological error, namely, that varioloid is a disease distinct from variola, but resembling it. Variola and varioloid are essentially the same disease; a contagium derived from a case of the latter, may give rise to the former in its regular and severest form. The forms embraced under the name varioloid are those having, as a characteristic, modifications which involve, in a notable degree, mildness of the disease. Modified smallpox, as it is called more appropriately than by the name varioloid, sometimes occurs spontaneously, that is, without any known modifying cause; but in most instances the modifications are due to either inoculation, the previous occurrence of the disease, or vaccination. Inoculation shortens the period of incubation by four or five days, as was first shown by Zabdiel Boylston; the eruption is usually slight; the usual series of changes may not take place; the secondary fever is wanting, and the fatality is small. This method of modifying the disease is resorted to, at the present time, only in the rare instances in which, after exposure to the contagion by persons unprotected by the vaccine disease, the virus of the latter cannot be obtained in season to secure prevention by vaccination. Persons who have once had smallpox are generally ever thereafter insusceptible to the contagium; but the protection sometimes ceases after a long period, and, as a rule, in a second attack the disease is materially modified. The modifying cause, however, in most cases, is vaccination. If vaccinia do not prevent smallpox, the latter generally occurs in an irregular form, being comparatively mild, and often a trivial affection. Inasmuch as the real difficulty in the diagnosis of smallpox relates chiefly to cases of so-called varioloid, it is important to direct the attention to those points which distinguish the disease from the affection with which it is apt to be confounded, namely, varicella.

The stage of invasion is of special importance in the diagnosis. It is sometimes shorter, but oftener longer, than in the regular form of the disease. The fever and associated symptoms are frequently, if not generally, as well marked as in the regular form. On the appearance of the eruption, the temperature falls suddenly to that of apyrexia, and the associated symptoms subside. This is not the history of varicella, as will be seen when that affection is presently considered. Various irregularities, in different cases, relate to the eruption. It may appear first elsewhere than on the face, and in remote situations simultaneously. It may be slight, or even insignificant, consisting of only a few pocks, or, on the other hand, more or less abundant. It is always small as compared with cases of the unmodified disease; the series of changes takes place more rapidly, and the eruption often aborts when it becomes papular or vesicular. There is little or no secondary fever. Convalescence is rapid, and the rate of mortality small. The scarlatiniform efflorescence which has been already referred to (*vide* page 639) as occurring in the stage of invasion, is much more frequent in modified smallpox. Numerous anomalies of the eruption, as regards its physical characters, observed in modified smallpox, received designations with which it is not important to burthen the memory. In cases of doubt as to the differential diagnosis of varioloid and varicella, the mouth and fauces should be examined for appearances of the eruption, which are not infrequently discovered. Certain of the vesicles in cases of modified smallpox may present the umbilicated appearance, and this is distinctive of the disease.

The hemorrhagic form of smallpox is in striking contrast with the disease as modified in the cases in which it is called varioloid. The hemorrhages may occur either during the stage of invasion, or the eruptive stage. Occurring in the former of these stages, death may take place before the eruption appears. Petechiæ and vibices are accompanied by a scarlatiniform efflorescence over more or less of the surface of the body. Extravasation is apt to take place into the conjunctiva and the subcutaneous tissue around the eyes. There may be vomiting of blood, and bloody dejections. The sputa may be sanguineous. The uterus and the kidneys may be the seat of hemorrhage. Occurring after the appearance of the eruption, extravasation takes place within the pocks, and frequently hemorrhage in a greater or less number of the different situations just named. Blood may escape from the throat and mouth. In the vast majority of the cases of hemorrhagic smallpox, the termination is fatal.

The complications and sequels of smallpox are, for the most part, incident to the eruption. Abscesses beneath the skin, erysipelatous inflammation, ulcers, and boils, are not infrequent. Laryngitis, caused by the eruption in the larynx, may lead to ulcerations and cause death by giving rise to œdema of the glottis. The eyes are sometimes the seat of ulceration, perforation, and iritis, leading perhaps to destructive consequences. Internal otitis is an occasional complication or sequel. Other affections accompany or follow the disease so rarely as to warrant the statement that the disease has no intrinsic tendency thereto, their connection being accidental. Occurring in women who are pregnant, the disease is apt to occasion abortion or miscarriage, and death. This is by no means an invariable rule; patients may pass safely through, and afterward give birth to healthy children. The fœtus in utero may contract the disease from the mother. In repeated instances children have been born with the eruption in progress. In some of these, death has not taken place until after birth. Instances have been reported in which the unborn child became infected from the mother, the latter not having the disease. The death of the child, either before or shortly after birth, is not invariable.

ANOMALIES OR IRREGULAR FORMS, COMPLICATIONS, AND SEQUELS OF MEASLES.

The affection of the air-passages, an almost constant element in this disease, in very rare instances is wanting (*rubeola sine catarrho*). The liability to error in these instances is in considering the disease rötheln or German measles, or as roseola. The distinctive points will be stated in connection with these affections. Another irregularity is the affection of the air-passages without the eruption (*morbilli sine morbillis*). This still rarer irregularity is to be recognized as such when the coryza with the laryngeal and bronchial symptoms are present accompanied by fever too intense to be purely symptomatic, the cases occurring when measles are prevalent, and not at a time when influenza prevails. The fever continues for about the duration of the stage of invasion, and then declines. The disease may be said to abort at the end of this stage. Occasionally the eruption is irregular in commencing on the trunk before it appears on the face. It may commence on the lower extremities, extending thence to the body and face, pursuing thus a course the reverse of that in the regular form. The eruption may be delayed by some local affection developed in the stage of invasion or incubation. Retrocession of the eruption shortly after its appearance, taking place coincidently with some complication, the latter being the cause rather than the effect, is an occasional anomaly. Another is a recurrence of the eruption after the disease has passed once through the eruptive stage.

Various of the cutaneous eruptions are in some cases developed in connection with the characteristic eruption, namely, erythema, miliary vesicles, lichen, urticaria, and herpes. Ulcers within the larynx in fatal cases are not rare. Pseudo-membranous laryngitis is an occasional complication. A grave complication, which is the cause of death in a considerable proportion of the fatal cases, is an extension of the bronchial inflammation to the smaller tubes (capillary bronchitis). This is apt to give rise to collapse of pulmonary lobules (broncho-pneumonia). Veritable pneumonia is not infrequent. This disease and the so-called capillary bronchitis are the dangerous complications; the fatality is chiefly due to these. Colo-enteritis in children and dysentery are to be reckoned among the complications. Well-marked diphtheria may be combined with measles, but much less frequently than with scarlet fever. Gangrene of the mouth and vulva has been known to occur in badly nourished subjects. The livid appearance of the eruption in certain of the cases of the so-called black measles (rubeola nigra) is due to cyanosis incident to pulmonary complications. The eruption, however, is sometimes combined with the petechiæ; and a rare event is the occurrence of hemorrhages in different situations, having the same gravity as in cases of hemorrhagic smallpox. The author has reported an instance of this kind.[1]

The various cutaneous eruptions to which patients are liable during the course of the disease, may either remain or be developed as sequelæ. To these are to be added ophthalmia, inflammation of the middle ear, and scrofulous enlargement of the lymphatic glands. Grave sequels are acute miliary tuberculosis and chronic pneumonic phthisis. These follow in a sufficient number of cases to show that an intrinsic tendency thereto is to be ascribed to measles. It is highly important, practically, to take cognizance of this fact.

---

[1] Principles and Practice of Med.

ANOMALIES OR IRREGULAR FORMS, COMPLICATIONS, AND SEQUELS OF SCARLET FEVER.

There are few, if any, diseases, the mildest and the severest cases of which are so widely apart as those of scarlet fever; and, perhaps, in no other disease are deviations from a typical course more numerous. The more important of the latter, as involved in diagnosis, will be mentioned, the reader being referred to other works for a fuller account than can be here entered into. The terms mild, severe, and malignant scarlet fever are convenient for grouping irregular forms of the disease.

Cases are sometimes so extremely mild—the patient not taking to the bed, perhaps manifesting no illness, the inflammation of the fauces slight, and the eruption indistinct—that the diagnosis is difficult, and sometimes an after conclusion based on the communication of the disease to others, or the occurrence of nephritis as a sequel. Scarlet fever without any affection of the fauces is rare, but instances occur. A case has recently fallen under the author's observation, the diagnosis, which had been considered doubtful, being established by the nephritic sequel, the case ending fatally by pneumonia. Faucial inflammation without an eruption (*scarlatina sine eruptione*) is not uncommon. There may be on the one hand considerable, and on the other hand little or no, fever. Persons who have once had scarlet fever, or whose susceptibility to the contagium has been diminished by age, often have more or less affection of the throat when brought into contact with cases of the disease.

In contrast to these mild, irregular forms, are those in which the deviations denote severity of the disease. Notable hyperpyrexia and frequency of the pulse characterize certain cases. In some cases convulsions occur, irrespective of renal disease, attributable to the intensity of the toxical condition of the blood. Active delirium occurs in some cases. The faucial affection not infrequently is much greater than in typical cases; the tonsils are greatly enlarged; they may suppurate, and sloughing sometimes takes place. In cases of an unusual affection of the throat (*scarlatina anginosa*), the cervical glands are often greatly enlarged, and gangrene may occur. The eruption in these cases is often incompletely developed or wanting.

Malignant cases are those in which the disease ends fatally within one or two days, and sometimes even a few hours after the attack. They are characterized by a high temperature—106°, 107°, or even higher—by coma, or a condition of collapse. Death may take place without any appearance of the eruption. The diagnosis would be impracticable often from the symptoms alone, or the appearances found after death. The occurrence of the cases during the prevalence of scarlet fever, and in families in which persons had been affected with this disease, may constitute the chief diagnostic evidence, taken in connection with the fact that the pathological condition is manifestly toxæmic, and the exclusion of other causes. The hemorrhagic form, in which hemorrhage takes place in different situations other than in the skin, may be considered as malignant. In this form there are usually a high temperature and grave cerebral symptoms.

Of the complications of scarlet fever, the most frequent are otitis, either external or internal, leading sometimes to destruction of the tympanum and the discharge of the ossicles of the ear; colo-enteritis in children; articular rheumatism; peritonitis, pleurisy, endocarditis, and pericarditis—these affections probably in many, if not in most, cases either rheumatic or uræmic; laryngitis, which may prove the immediate cause of death; coryza, ophthalmia, and gangrene of the mouth (noma). Diphtheria is not infrequently combined with scarlet fever. The presence of a diphtheritic exudation in the pharynx is evidence of the coexistence of the two diseases. The exudation here, as in other instances, is to be distinguished from the pultaceous secretion from the follicles, and the deposit of concrete mucus, which may give rise to an appearance resembling that of a pseudo-membrane. The differential characters have been considered (*vide* page 269).

Parenchymatous or tubal nephritis (acute albuminuria) is sometimes a complication giving rise, in certain cases, to coma and convulsions, etc. It is much oftener a sequel. It follows scarlet fever in so many instances, and is so rare except in this pathological connection, that its occurrence serves to establish, in some cases, the diagnosis when this had been doubtful. With reference to the liability to this complication, the urine should be examined daily during the course of the disease. The presence of albumen or casts is evidence of the renal complication. To determine whether a sufficient amount of urea is eliminated to protect against the grave effects of uræmia, the quantity and specific gravity should be ascertained daily. Attention should be given to the urine for several weeks after the date of convalescence, sufficiently to determine either the existence or absence of the nephritic sequel. It is to be borne in mind that this sequel may follow the mildest as well as severe cases, perhaps occurring more frequently after the former than after the latter.

Parenchymatous nephritis following scarlet fever may occasion anasarca; or phenomena attributable to uræmia may take place without, as well as with, general dropsy. Coma and convulsions, acute pulmonary œdema, œdema of the glottis, pericarditis, or other serous inflammations, are uræmic effects which may destroy life after patients have passed safely through the fever. In order to foresee and forestall these grave effects of uræmia, it is immensely important to keep watch of the urine as regards quantity and specific gravity. It is a good precaution to watch the urine of persons who have been exposed to the scarlatinous poison, although scarlet fever be not produced. That this poison will cause parenchymatous nephritis without causing scarlet fever, is certain. The author could cite from his own experience abundant evidence of the correctness of this statement.

VARICELLA.

This eruptive disease, which in past time has received a considerable number of names, is known popularly in this country as "chicken-pox." Its non-identity with variola will not be here discussed. That the two affections are specifically distinct seems so clearly established as to render it a marvel that some able observers and writers should still hold to the doctrine of their unity. It must, however, be admitted that varicella resembles variola in its mild, modified form (varioloid). This fact makes the study of varicella, with reference to its diagnostic characters, important. The points involved in the differential diagnosis will alone claim consideration in this work. That chicken-pox and modified smallpox are not infrequently confounded, is certain. To mistake the former for the latter, subjects patients and others to inconveniences which are wholly unnecessary. Among these is to be named sending patients to hospitals where they are brought into contact with cases of smallpox, and are thus liable to contract the disease. But to mistake smallpox for chicken-pox may lead to serious consequences from the lack of precautions to prevent the diffusion, by infection, of the former. This mistake accounts, in a measure, for the spread of smallpox at times when it is more or less prevalent. The diagnosis of varicella is easily made in cases which are under observation from the commencement. A retrospective diagnosis, the facts having to be obtained from non-professional testimony, is not always easy. The physician is called upon to make the differential diagnosis chiefly when smallpox prevails. At other times, parents, nurses, or neighbors often do not hesitate to decide upon the character of the disease without seeking a medical opinion.

Varicella is an eruptive disease, very rarely affecting adults, but limited to infancy and childhood; the eruption occurs either without an appreciable stage of invasion, or the duration of this stage does not exceed twenty-four hours; the eruption is primarily, or almost immediately, vesicular, and the vesicles do not become pustular; it is accompanied by slight, if any, fever or constitutional disturbance; the vesicles contain a clear liquid which is either absorbed, or, if it escape, forming, by desiccation, a crust rather than a scab. It should be added that the vesicles may suppurate and form scabs if they are irritated by scratching or in other ways. The duration of the disease is from three to five days. The period of incubation is about two weeks.

The number of vesicles varies considerably in different cases, the range being from ten to several hundred. They rarely exceed fifty or a hundred. They appear in successive crops. They may attain to the size of a split pea. They are never confluent. They appear often on the trunk prior to, or simultaneously with, their appearance on the face and scalp. They never have the central depression or umbilication which is characteristic of the variolous vesicle. They are more superficial than the latter, and rarely leave permanent cicatrices. The vesicles in varicella, as in smallpox, may occur on mucous surfaces, namely, on the soft and hard palate, prepuce and vulva. As compared with smallpox, however, the instances are rare. Numerous efforts, by different observers, to communicate varicella by inoculation with the contents of the vesicles, have failed. The disease is communicated by an infectious miasm, and is rarely experienced twice by the same person.

In contrast with the foregoing, modified smallpox, with which alone varicella can be confounded, has the following differential points: It affects adults oftener than children. The reason of this is, the modification is due generally to vaccination, and the protection afforded by the latter diminishes with time. Children who have been vaccinated are more likely to be fully protected than at a later period of life. When it is a question as to a case being one of either varicella or varioloid after adult age, the probabilities are vastly in favor of the latter.

In the mildest cases of modified smallpox, a well-marked stage of invasion of at least two days' duration is very rarely, if ever, wanting. The fever in this stage is often as intense as in case of unmodified smallpox. If a fever of two days' duration precede the eruption, and this fever be not due to some accidentally associated affection, the decision, as between varicella and varioloid, should be that the latter exists.

In all cases of modified smallpox, the eruption is papular for from twelve to twenty-four hours before it becomes distinctly vesicular. If, therefore, the first efflorescence of the eruption be observed, the fact that papules precede for some hours the vesicles, establishes the diagnosis.

More or less of the vesicles in most cases of modified smallpox, become pustular. This does not occur in the cases in which the eruption aborts at the stage of early vesicles. The diagnostic criterion, however, of the variolous vesicle, that the contents become purulent, is available in the majority of instances.

The central depression is found in a certain number of the vesicles of modified smallpox. It is never found in varicella. This criterion of the former is therefore decisive.

The eruptions in modified smallpox, after becoming pustules, rupture and form scabs instead of crusts.

Varicella affords no protection against smallpox, and *vice versa*.

VACCINIA.

In its power to either prevent or favorably modify variola, consists the clinical importance of vaccinia or cow-pox. The voluntary production of the disease by vaccination, has for its object the prevention of smallpox. Vaccination effects this object, in most persons, either during life or for a greater or less period. That its protective power diminishes after the lapse of time, in a certain number of instances, must be admitted. Without inquiring here into the cause of this fact, practically it enforces the necessity of repeating the vaccination from time to time. When complete prevention is not secured, the effect of vaccination is to modify the action of the contagium of smallpox, so that this disease occurs in a mild form commonly called varioloid. Were this the only effect of vaccination, that is, if it never prevented but only modified smallpox, the discovery of Jenner would still be of great value. But the truth is, by means of vaccination and revaccinations, the prevention of smallpox is effective in the vast majority of cases. During the fourscore years since Jenner's discovery, it has saved the lives of many millions of the human race.

At the present time, the vaccine virus in use is derived from two sources, namely, the disease as produced in man from successive vaccinations since Jenner's day, and as derived from the cow at a recent date, the propagation being kept up by successive inoculations in animals of the same species. The former is distinguished as the humanized, and the latter as animal or bovine virus. The latter is to be preferred for these reasons: There is good ground for the belief that the long-humanized virus has undergone deterioration in its protective efficacy, and that the bovine virus is more efficacious. The latter is more reliable for the production of the vaccine disease; success in primary vaccinations and in revaccinations can be counted upon with greater certainty. It is less likely to occasion local ulcerations and erysipelas. It is exempt from the liability to the communication of syphilis, or other diseases. That syphilis has been communicated by means of humanized virus is certain. The use of the bovine virus protects the physician against the unfounded suspicion of having communicated scrofula, or other human diseases. This last consideration is of not a little importance. Not an unimportant advantage of the bovine virus is, it can be readily supplied in quantities to meet any emergency.

Vaccinia is a disease characterized by the occurrence at the points where the vaccine virus was inserted, of vesicles resembling closely in their characters the vesicles of smallpox. After a period of incubation lasting about three days, there occur, first, red spots, then papules, the latter followed by oval or round vesicles which increase in size, reaching their acme (⅙ to ⅓ inch in diameter) in ten or twelve days, if the bovine virus has been used, and in about eight days if the vaccination was with the humanized virus. The pocks are multilocular and umbilicated. Crusts are formed, without rupture, by the eighteenth or nineteenth day, and they remain adherent for many days afterward. When fully developed, the vesicles are surrounded with an areola of erythema. The part is painful and tender. The neighboring lymphatic glands are sometimes enlarged. There is some fever, together with other evidences of constitutional disturbance. Occasionally vesicles make their appearance at other than the points of vaccination, presenting the central depression characteristic of variola.

In the performance of vaccination, lymph from the vaccine vesicle is to be preferred to the crust. The preferable method is to make numerous short, very superficial incisions, or rather scratches, with the point of the lancet, causing the least possible escape of blood, and rubbing over the scratched surface the ivory or quill point coated with the lymph. It is customary in this country to produce a small number of vesicles, rarely more than two or three. Facts show conclusively that a larger number insures greater protection. The vaccination is most efficient when five or six vesicles are produced on each arm. The arm should always be selected as the place for the vaccination, as it is often desirable to examine to see whether persons have been vaccinated, and whether the cicatrices are characteristic. The distinctive mark is a series of minute depressions, each corresponding to one of the multilocular divisions of the vesicle. In girls it is not an unimportant matter to vaccinate in a situation where the cicatrices will not be visible when dresses are worn which leave the upper part of the chest and the arms bare. The arms should invariably be examined at, or shortly after, the seventh day from the date of the vaccination. The physician should never be satisfied with a report that the vaccination has been successful.

Revaccinations are highly important. It is a wise precaution to revaccinate after intervals of a few years, with a view to test the susceptibility to the vaccine virus. Often, in those who have been vaccinated, a revaccination causes a vesicle which occurs sooner than after a primary vaccination, and lacks the characters of the latter; it is smaller, conical, and devoid of the central depression. This incomplete vesicle shows that the susceptibility to the virus is not entirely extinguished, and it is a fair inference that the protection against smallpox is also incomplete. Revaccination should always be at once resorted to after any known exposure to the contagium of smallpox.

A primary vaccination should not be deferred for a longer period than three months after birth.

The best mode of preserving lymph is in capillary glass tubes hermetically sealed. It may be useful to know, when the supply of lymph is limited, that it may be combined with glycerin without losing its activity.

Rötheln or German Measles, and Roseola.

These affections are important chiefly with reference to their discrimination from measles and scarlet fever. There is greater liability to error of diagnosis in making this discrimination, than to failure in discriminating from each other, smallpox, measles, and scarlet fever. The error, however, is not one which leads to serious consequences.

Concerning the disease called by German writers rötheln, and generally referred to in this country under the name "German measles," not much is to be found in American medical literature. Prof. J. Lewis Smith described an epidemic which occurred in New York in 1874, and stated that, so far as he was aware, this was the first instance of the disease having been observed on this continent.[1] There is reason to believe that it has prevailed at different times and places, to a greater or less extent, and been considered by physicians as epidemic roseola. That there is an exanthematous disease which is distinct from measles, although bearing in some respects a similitude to it, is shown by the fact that, aside from symptomatic distinctions, neither affords any protection against the other. In Germany, rötheln is also called rubeola. The latter term, as used by English and American writers, denotes measles, and there is no good reason why its application should be changed. To do so would give rise to much confusion. The term rubeloid, which has been suggested, is not inappropriate. Rubeola and rosalia are terms which have been applied to the disease; also "false measles," and "bastard measles." Roseola would perhaps be the best name, except that it is applied to other affections.

The disease occurs as an epidemic, sporadic cases being rare. It affects especially children. It is, however, not extremely infrequent after puberty, up to the age of forty. After the latter age, it is seldom observed. Of 54 cases recorded by Prof. Smith, 45 were between 2 and 10 years of age, and the age of the oldest of the patients was 30. The stage of invasion is either wanting or of brief duration, rarely lasting more than a day. This is a diagnostic point as regards differentiation from measles, the latter having a stage of three or four days prior to the eruption. The eruption is in the form of small circular patches and points, of a rose color. It may appear first on the back, but generally on the face and neck, extending, more or less, over the body within twenty-four hours. It fades and disappears within a period varying from two to four days. Itching is sometimes a troublesome symptom. The eruption differs from that of measles in being smaller, less papular, the spots round instead of oval, and the crescentic arrangement wanting. Increase of temperature in the eruptive stage is slight or absent, the disease differing, in this respect, from even a mild form of measles. The fauces, nostrils, and conjunctiva of the eyes, are affected as in measles, but in a less degree. The larynx and bronchial tubes are rarely affected, or, if at all, but slightly. There is no tendency to capillary bronchitis or pneumonia. Furfuraceous desquamation sometimes follows the eruption, but its occurrence is exceptional.

---

[1] *Vide* Archives of Dermatology, New York, October, 1874.

The disease has no fatality. Patients do not feel ill enough to keep the bed. It may be associated with diphtheria, or other affections which may prove fatal.

As already stated, that this disease is distinct from measles is shown by its not affecting the susceptibility to the contagium of the latter. Prof. Smith states that, of 48 of the cases observed by him, 19 had had measles, and, of a number of cases occurring in a foundling asylum in New York, a considerable proportion had just recovered from that disease. Attention to the symptomatic points which have been stated, render the diagnosis, certainly in most cases, easy. In some instances the eruption bears a resemblance to that of scarlet fever. As regards the temperature, the disease is wholly unlike the latter, excluding the few instances in which scarlet fever is so extremely mild as to be trivial. If rötheln prevail as an epidemic, and scarlet fever be not prevalent, these facts are to be considered in the diagnosis.

Rötheln is probably communicable, and not, as a rule, experienced but once.

Roseola is a term applied to an exanthematous affection, and to an eruption which occurs as a symptom in different pathological connections. It is to be distinguished from erythema. The latter belongs among the cutaneous diseases. It is limited to certain portions of the skin, and is of a bright red, instead of a rose color. Roseola is an exanthem of a rose color, as the name implies, affecting a considerable part or the whole of the cutaneous surface, accompanied by some fever, and other symptoms of constitutional disturbance. It is apt to be mistaken for scarlet fever. The differential points are the color of the efflorescence, which is of a rose and not scarlet redness; its occurrence sometimes on the body and extremities prior to, or without, its appearance on the face; the absence of faucial inflammation; its speedy disappearance without being followed by desquamation; a much less degree of fever than that which usually attends scarlet fever; the non-occurrence of subsequent cases attributable to infection, and of albuminuria as either a concomitant or sequel. All these differential points are not at once determinable, and there are instances in which it is difficult or impossible to decide at the outset whether the affection be roseola or mild scarlet fever. In these instances it is prudent to act as if the affection were the latter. The prevalence of scarlet fever, or otherwise, is to be taken into account, and it is by no means proof of lack of knowledge, if the physician defer a positive diagnosis.

As already stated, it is probable that epidemic roseola has been not infrequently confounded with Rötheln, or German measles, and this mistake is not of great practical importance.

As a symptomatic event, roseola occurs in different affections, namely, dengue, modified variola, vaccinia, epidemic cholera, and syphilis. It may be an effect of certain drugs, namely, balsam of copaiba, cubebs, iodide of potassium, turpentine, and quinia. The last-named drug occasionally gives rise to a scarlatiniform eruption, which may extend over the entire surface of the body, and be followed by extensive lamellar desquamation.

Prevention of Smallpox.

The prevention of this disease in individual instances, and of its diffusion through successive cases which are foci of infection, is to be effected by means of vaccination. Relying upon this preventive measure, it was formerly the custom in Parisian hospitals to treat cases of smallpox in wards occupied by patients with other diseases. This is not to be recommended. Patients with smallpox should be treated in hospitals devoted to cases of this disease. In private houses they should be isolated from every one except nurses, attendants, and physicians. It has been asserted that a contagium is not produced prior to the stage of eruption, and that, up to this period, the disease is not, therefore, communicable. Undoubtedly it is much more contagious during the stages of eruption and desiccation than previously, but facts show that a contagious miasm may emanate even from the dead body before the characteristics of the eruption are declared. Burials should take place privately. Nurses and attendants upon patients should not be brought into proximity to others. Physicians should not see other patients immediately after visiting smallpox hospitals, or private cases. The contagium may remain in clothing, bedding, etc., and retain its activity for an indefinite period. Everything, therefore, in contact with smallpox patients should be either destroyed or thoroughly disinfected. The disinfection should extend to the floors, walls, and ceilings of apartments, together with the furniture. After convalescence and recovery, the liability to communicate the disease does not cease until every particle of the crusts or scabs of the eruption is removed from the surface of the body.

Treatment of Smallpox.

Smallpox can neither be cut short nor its duration controlled by any of the different methods of treatment which have been employed for these ends; and it must be admitted that, with our present knowledge, the disease, after its commencement, cannot be essentially modified. The latter would be a most desirable end, considering the danger to life, and of disfigurement when the partial protection afforded by vaccination is wanting. These statements enhance the importance of obtaining the utmost possible protection which vaccination and revaccinations can offer.

In mild cases of so-called varioloid, little or no treatment is required beyond hygienic measures. Patients are often not ill enough to keep the bed, and, except for the danger of communicating the disease, would sometimes be out of doors. In cases of greater or less severity, the indications are to be derived from the symptoms. During the stage of invasion, the intensity of the fever may indicate antipyretic treatment. Quinia in full doses, sponging the surface of the body, and even the cold bath, or wet sheet may be resorted to, as in other essential fevers. It does not appear that the reduction of the temperature has any marked effect upon the eruptive stage, that is, in lessening the abundance of the eruption. Pain in the back may call for opiates in the stage of invasion. Remedies to relieve irritability of the stomach may be indicated. In view of the fact that the extensive suppuration renders the eruption equivalent to an important complication, involving, as a purely local affection, often, a certain amount of danger, everything which will impair tolerance is contraindicated. No one, at the present day, advocates blood-letting, purgation, or mercurialization in this disease. On the contrary, the vital powers, from the outset, are to be economized and sustained.

In the eruptive stage, the mitigation of pain and soreness incident to the eruption is an object of treatment. Much relief is afforded by evaporating lotions or the application of cold water. There is no danger of harm by repressing the eruption as a consequence of these measures. Wet compresses should be kept constantly over the eyes, to prevent, if possible, injury of these organs. The chief indications derived from the general symptoms are for supporting measures, namely, tonic remedies, alcoholics, and alimentation, these being urgently indicated in proportion as the symptoms denote failure of the vital powers. In fatal cases, the mode of dying is generally by asthenia. In the employment of supporting measures the rules are the same as in the treatment of other essential fevers.

During the stage of desiccation, the warm bath is of service by aiding in the removal of the crusts. Oleaginous inunctions are useful. The fetor, which is sometimes extreme, may be diminished by ablutions with water, to which a little carbolic acid has been added.

In cases of hemorrhagic smallpox, local styptics and hæmostatics are indicated, but they are generally useless, death being the rule in these cases.

A variety of measures have been employed to prevent the full development of the eruption, especially on the face, in order to prevent the characteristic pitting. The author has given a list of the more important of these ectrotic measures in another work.[1] Probably the most efficient of them is the tincture of iodine applied by means of a camel's-hair brush while the eruption is papular. Prof. J. Lewis Smith has used with satisfaction pulverized charcoal made into a paste with sweet oil or glycerine, applied daily or twice daily.

---

[1] *Vide* Principles and Practice of Medicine, 4th ed., page 964.

Abscesses, boils, ulcerations, and erysipelatous inflammation claim the same topical measures of treatment as when they occur independently of their connection with this disease.

Prevention of Measles.

The diffusion of measles is exclusively by a contagium which emanates from the body in the stage of invasion, as well as during the continuance of the eruption, and probably, also, in the stage of desquamation, although the contagiousness in the latter stage is denied by some. The contagium may adhere to inanimate substances, such as bedding, clothes, etc., retaining its activity for a period, the duration of which is not, as yet, ascertained. In order to prevent the disease from being diffused, patients are to be isolated; intercourse with others of those in constant attendance is to be restricted, and physicians should wash their hands, and expose themselves freely to the air before making other visits. The rooms of patients should be well ventilated in order to prevent accumulation and concentration of the infectious miasm. The bedding and clothes of the patients should be disinfected. It is not safe to allow patients to come into close proximity to others who are susceptible, until desquamation is complete. The desquamated cuticle should be thoroughly removed by repeated baths.

It is difficult to prevent the diffusion of the disease, because the diagnosis often is not made prior to the stage of the eruption. During the three or four days of the stage of the invasion, the patient may be supposed to have only a "cold," and in many instances the symptoms are not sufficiently severe for confinement within doors. Children in this stage may continue to go to school, associate with their companions in play, etc. Under these circumstances the disease is communicated. When there is reason to suspect the character of the disease prior to the eruption, it is proper to place patients in quarantine until the diagnosis is determinable.

Preventive measures are apt to be thought of little consequence, because the disease is generally without danger, and it is thought desirable to have had it in order that the liability to it may be destroyed. Its prevalence, however, at certain times and places may be very undesirable, as in military encampments, boarding schools, children's hospitals, tenement houses, hotels, etc. It may then be of much importance to remove or isolate cases, and resort to the other preventive measures.

Treatment of Measles.

In the treatment of most cases of measles, palliative remedies and hygienic regulations are all that are required. Troublesome cough and restlessness are to be alleviated by mild anodynes The inhalation of warm vapor may be advised if it be found to relieve of the inconvenience from the coryza and bronchial irritation. Dryness and heat of the surface may be relieved by tepid or cold sponging. There need be no apprehension that repercussion of the eruption will be thereby produced. If there be hyperpyrexia, cold sponging as an antipyretic may be employed as in other fevers. Mild diaphoretic remedies, *e. g.*, the liquor ammoniæ acetatis, are probably useful by favoring the full development of the eruption, should this be tardy or incomplete. Perspiration, however, should never be produced by an undue quantity of clothing, or by keeping the atmosphere of the room at a high temperature. It is desirable that physicians should endeavor to remove the prevailing popular notion that there is special danger from cool air (60° Fahr.) and free ventilation in the eruptive fevers. Patients with this disease are not likely to "take cold," notwithstanding the intrinsic tendency to bronchial inflammation. Exposure to a current of cold air is, of course, to be avoided. Inunction of the body with oil, cocoa-butter, or vaseline, twice or thrice daily, is a source of comfort, relieving pruritus, and promoting desquamation. The bowels should be moved by mild laxatives or enemas. Cathartics are to be avoided. If diarrhœa occur, it should be relieved by opium and astringents.

Sustaining treatment is indicated in feeble subjects, and by the occurrence of complications. Acute bronchitis and pneumonia are to be treated on the same principles as when they occur irrespective of this pathological connection. An effort should be made to render them abortive or diminish their severity by full doses of quinia. If this remedy be not well tolerated, salicin may be used as a substitute, in doses twice or three times larger. The treatment in cases of measles associated with diphtheria, does not differ from that indicated by the association of the latter with other affections. A complication of minor importance is ophthalmia; to prevent which the eyes should be shaded from a bright light, and kept cool by repeated ablutions.

Inoculation has been practised as a means of rendering the course of the disease milder. That the disease has been produced by inoculation with blood, serum from vesicles casually present, the mucus from the nostrils and the tears, seems certain; but trials have oftener failed than succeeded. Facts reported appear to show that the disease is milder when thus produced. Owing to the uncertainty of the operation, however, and the fact that the disease exceptionally involves danger, very little interest has been felt in the matter.

Prevention of Scarlet Fever.

The importance of preventing the diffusion of this disease is very great. While in its mild form it is one of the mildest, in its severe form it is one of the severest of diseases. In certain cases it is entitled to be called malignant, if this name can be properly applied to any disease. Although, therefore, if a person pass safely through scarlet fever, there is abundant room for congratulation on the score of the susceptibility having been probably destroyed, it is by no means desirable that the disease be incurred for this object. As an additional reason for avoiding the disease, the susceptibility to its special cause diminishes after adult age; hence, if escaped during childhood, the probability is that it will never occur. Facts having an important bearing on the prevention are, the disease may be produced by the smallest conceivable quantity of contagium, and the latter adheres with great tenacity to material substances, preserving its activity for a long period. The following instance has been noted by the author: A young woman connected with a religious order of charity in this city, nursed a child with scarlet fever in the country, ten months prior to the time of making this record. The dress which she wore was aired a day there, and for several days after her return to the institution in this city. It was then put aside, and several weeks afterward, the waist was given away, and the skirt packed in a trunk. Ten months afterward she wore the skirt. In ten days a case of scarlet fever appeared, there having been no other known exposure to contagion. The child affected with the disease was much of the time with this young woman.

The foregoing record was made February 18, 1870. In January, 1871, the young woman was seized with acute pulmonary œdema, associated with parenchymatous nephritis, which proved fatal, this renal affection not preceded by any symptoms of scarlet fever. A week before her illness she had again, for the first time since the previous record, worn the dress in which she nursed the child with scarlet fever.

The diffusion of scarlet fever is to be prevented by the isolation of patients, as in cases of smallpox and measles. Everything coming out of the rooms in which patients are treated, should be disinfected or destroyed. This injunction extends to the excreta and the sweepings from the floor. It is not improbable that the disease may be diffused by the contagion contained in excreta not disinfected after they have found their way into sewers and cesspools. It has been supposed that, like the contagium of typhoid fever, it may be disseminated in drinking water. Physicians, after visiting cases of scarlet fever, should immediately wash their hands, using, if available, the carbolic acid soap, and it would not be an excessive precaution to change their outer garments before seeing other patients. After recovery from the disease, patients should be interdicted from intercourse with members of the family and others until desquamation is complete, and every particle of desquamated cuticle has been removed by baths. Budd advises, as a protective measure against the detachment of cuticle containing the contagium in a dried state, oleaginous inunction, the article used containing a little camphor or carbolic acid. Children should not be allowed to attend school if they come from houses in which there is scarlet fever. This rule should be strictly enforced. The practice of permitting cases of the disease to be treated in hotels, boarding houses, etc., without the knowledge of health boards, and the enforcement of proper provisions to prevent the diffusion of the disease, is morally reprehensible, and should be legally punishable. Further details respecting preventive measures are embraced in the following regulations of the Metropolitan Board of Health of the city of New York:—

"*Care of Patients.*—The patient should be placed in a separate room, and no person except the physician, nurse, or mother, allowed to enter the room, or to touch the bedding or clothing used in the sick-room, until they have been thoroughly disinfected.

"*Infected Articles.*—All clothing, bedding, or other articles not absolutely necessary for the use of the patient, should be removed from the sick-room. Articles used about the patient, such as sheets, pillow-cases, blankets, or clothes, must not be removed from the sick-room until they have been disinfected, by placing them in a tub with the following disinfecting fluid: eight ounces of sulphate of zinc, one ounce of carbolic acid, three gallons of water.

"They should be soaked in this fluid for at least one hour, and then placed in boiling water for washing.

"A piece of muslin, one foot square, should be dipped in the same solution and suspended in the sick-room constantly, and the same should be done in the hallway adjoining the sick-room. . . .

"All vessels used for receiving the discharges of patients should have some of the same disinfecting fluid constantly therein, and immediately after use by the patient be emptied and cleansed with boiling water. Water closets and privies should also be disinfected daily with the same fluid, or a solution of chloride of iron, one pound to a gallon of water, adding one or two ounces of carbolic acid.

"All straw beds should be burned. . . .

"It is advised not to use handkerchiefs about the patient, but rather soft rags for cleansing the nostrils and mouth, which should be immediately thereafter burned.

"The ceilings and side walls of the sick-room after removal of the patient should be thoroughly cleaned and lime washed, and the woodwork and floor thoroughly scrubbed with soap and water."

Treatment of Scarlet Fever.

With our present knowledge, scarlet fever cannot be cut short nor its course abridged. The expectant treatment is therefore to be pursued; in other words, the treatment is to be governed by symptomatic indications. It does not follow that potential measures are never to be employed. The judicious employment of these, in certain cases, may do much toward diminishing the severity and the fatality of the disease.

In mild cases there are no indications for active treatment. The fever is slight or moderate; there are few, if any, symptoms which call for palliative measures, and important complications are wanting. It is always a prudent precaution to keep patients in bed, and the tepid bath or sponging daily is to be advised. Measures for preventing the diffusion of the disease are not less important in mild than in severe cases; and the fact that the renal affection is as apt to occur after the former as the latter, should enforce, equally, care during convalescence.

Cases of extreme severity, or those distinguished as malignant (*vide* page 747), offer little in the way of encouragement from any treatment. The tendency to a fatal result often cannot be withstood by any known therapeutical measures. The means of neutralizing the toxical principle in the blood, or of counteracting its effects, are yet to be discovered. A lethal coma is to be opposed by revulsive applications to the surface. Sinapisms, mustard baths, and the wet pack, are in accordance with rational indications. The symptoms denoting asthenia indicate the free use of alcoholic stimulants. The attempt is to be made to control hemorrhages by the local application of cold and other styptics, together with hæmostatics, such as ergot, etc.

Of the cases in which there is more or less of severity, but falling short of that which constitutes malignancy, in many the most important indications relate to hyperpyrexia. Quinia may be given in full doses, as when this remedy is used as an antipyretic in the treatment of other fevers (*vide* page 675). The most efficient of the means of reducing temperature is the wet sheet (*vide* page 674). Currie demonstrated the efficiency of the cold affusion in this disease, and, at a later date, Trousseau testified to the success of this method of refrigeration. It is, however, probable that all the effect to be obtained thereby can be secured by the cold bath, and that the wet sheet is as efficient as the latter. The body heat is to be reduced to a moderate degree, and the reduction maintained by the repetition of the employment of cold as often as may be required. Too much can hardly be said of the importance of antipyretic treatment in all cases in which the hyperpyrexia is to be considered as the chief source of danger. From an experience not extensive, nor, on the other hand, very limited, the author can bear testimony to the success of this treatment. It is to be employed without any reference to the eruption.

If the pyrexia be considerable or moderate, sponging the body with cold or tepid water will suffice. The sponging is to be continued and repeated according to its effect. The wet pack reduces the fever and has a sedative effect. The patient may remain in the pack for an hour or two, and it may be repeated *pro re nata*. The evidences of its usefulness are reduction of the body heat, diminution of the frequency of the pulse, and a manifest soothing effect.

Inunction of the surface is a highly useful measure. It is particularly so when pruritus is a troublesome symptom. As already stated, it is to be recommended as preventing the detachment from the skin of epidermic particles containing the contagium in a dry state. For the latter object it is especially advisable during desquamation. The cold cream ointment and vaseline are preferable for inunction to lard or olive oil. Glycerine with rose-water makes a good article for this purpose. The pulse becomes less frequent and the temperature diminishes not infrequently after the inunction. It may be repeated two or three times daily. It need not conflict with sponging, the wet sheet, or the wet pack.

Anodynes are indicated if restlessness and vigilance be not relieved by sponging and the wet pack. Opium in some form, given with caution, is of use, if the effect otherwise be good, by promoting moisture of the skin. Dover's or Tully's powder is an eligible preparation.

In severe cases, with symptoms denoting asthenia, alimentary and alcoholic support is an important part of the treatment. The best form of nourishment is milk with the addition of lime-water. Milk-punch and wine-whey are the best alcoholic preparations for children. As regards the quantity of alcoholics to be given, the rules are precisely the same as in other fevers. In some cases the tolerance of alcohol is notably augmented in this disease, as compared with the state of health.

Cathartics are never to be employed. Relief of inconvenience from constipation is to be procured by enemas. All remedies which disturb the stomach, or which are perturbatory in any way, are contraindicated.

If the disease be accompanied by much affection of the throat (scarlatina anginosa), this claims treatment. Prof. J. Lewis Smith recommends the application every three or four hours, by means of a probang or a large camel's-hair pencil brush, of a mixture consisting of half a drachm of carbolic acid and three drachms of the chlorate of potassa, with two ounces of glycerine and four ounces of water. To remove fetor, the insufflation of pulverized salicylic acid and bismuth may be employed, as recommended by Prof. Lusk in cases of diphtheria (*vide* page 710). Cauterizing or irritating applications to the fauces are, to say the least, of doubtful propriety. As an external application to the throat, Prof. Smith prefers, over any other, a slice of salt pork. It is a widespread popular belief that this application has much efficacy. "A slice of salt pork, cut as thin as possible and stitched to a single thickness of muslin or linen, should pass from ear to ear, the cloth being tied or pinned over the vertex. It is best to sprinkle salt or salt and pulverized camphor upon the pork in order to secure a more prompt effect." Prof. Smith adds: "If the application be properly made, the surface usually begins to be reddened in twenty-four hours, and, by the second day, an impetiginous eruption appears upon the part covered. Counter-irritation gradually produced in this way causes little suffering. Patients ordinarily do not complain of it at all. This application should be continued through the fever, being occasionally left off for a day or two, as too much soreness is produced, and a linen cloth smeared with sweet oil or some simple ointment applied in its place."[1] If there be glandular swellings on the neck, with inflammation, poultices or the water dressings are to be applied.

Otitis and ophthalmia require appropriate local treatment in order to prevent permanent impairment of sight and hearing. Arthritic inflammation, which is usually mild, is to be treated by the application of anodyne liniments, and the rest secured by bandaging.

An object in the treatment of scarlet fever, as well as other fevers, to be sought after and hoped for, is the discovery of curative remedies, that is, remedies which destroy the special morbific principle in the blood, or render it inoperative. It should be stated that, in the opinion of some, certain remedies do control, in a measure, the disease. Sansom refers to a communication from Dr. Alex. Keith (London *Lancet*, Jan. 22, 1869), in which the results, as regards death-rate, are given of the treatment of six hundred cases of scarlet fever, measles, and smallpox by the internal administration of carbolic acid. The mixture used consisted of carbolic acid, acetic acid, of each from one fluidrachm to a drachm and a half; tincture of opium, one fluidrachm; water to eight fluidounces. A tablespoonful to be given every four hours until the fever has subsided. Of the six hundred cases five only were fatal. The communication is defective from the absence of any classification of cases.[2] Sansom gives the results of an analysis of twenty-nine cases of scarlet fever, some of which were of extreme severity, treated with the *sodium sulpho-carbolate.* In one case only was there a fatal result, and this was of a child nine months of age, presenting the maculæ of hereditary syphilis. Complete convalescence took place in nine cases in seven days; in three cases in eleven days, and in almost all the others in fourteen days. The sulphites of soda and magnesia have been used considerably in scarlet fever and other fevers. Some of the medical friends of the author are convinced that thereby a certain amount of controlling influence is exerted. It is not an extravagant expectation that, at a future time, all the different fevers will be under curative control, as, at the present time, the malarial fevers are controlled by quinia, and rheumatic fever by salicin or salicylic acid.

---

[1] Diseases of Children.

[2] *Vide* The Antiseptic System, by Arthur Ernest Sansom, M.D., London, 1871.

After convalescence from scarlet fever, care is to be taken as regards imprudences in eating or drinking, exposure to cold, and over-exertion of mind or body, with reference to the development of parenchymatous nephritis (acute albuminuria). The daily use of the tepid bath is to be advised. The urine should be examined at short intervals, in order to discover the earliest manifestations of renal disease. The diagnosis and treatment of this sequel have been considered (*vide* page 418).

IV.

RHEUMATISM AND GOUT.

ACUTE AND SUBACUTE RHEUMATISM. CHRONIC RHEUMATISM. ACUTE AND SUBACUTE GOUT. CHRONIC GOUT. RHEUMATIC GOUT, OR RHEUMATIC ARTHRITIS.

RHEUMATISM and gout are regarded as kindred diseases. Both are constitutional diseases with arthritic manifestations. Beyond this, there is very little which shows pathological relationship. A primary attack of rheumatism usually occurs under thirty years of age; gout is rarely experienced prior to that age. Gout affects especially the small, and rheumatism the larger, joints. Gout is very often hereditary; rheumatism less frequently so. Pericarditis and endocarditis are frequent complications of rheumatism, whereas they do not occur in cases of gout. In gout there is an excess of uric acid in the blood (uricæmia, lithæmia). This condition of the blood does not exist in rheumatism, but the *materies morbi* is another acid, probably the lactic. The arthritic affections have points of dissimilarity. In gout there is a deposit within and around the affected joints, the urate of soda entering largely into its composition. There is no such deposit in rheumatism. The pain in gout is greater, and more paroxysmal in its occurrence than in rheumatism. These points of divergence of the two affections show that they are pathologically different. They are distinct affections, and, although akin, they are not very closely related to each other.

Acute and Subacute Rheumatism.

The name articular rheumatism was necessary to designate this affection when various other affections were called rheumatic. The term rheumatism is now, however, sufficiently restricted and definite in its meaning to render the adjective articular superfluous. The names muscular rheumatism and gonorrhœal rheumatism, it is true, are still in use, each being a misnomer. The former has been considered as belonging among the neuralgic affections, and the proper term to apply to it is myalgia. The latter is a surgical malady which will be referred to in connection with the diagnosis. Rheumatic polyarthritis is a name which is distinctive, but objectionable on the score of its implying that the affection is purely a local inflammation. Rheumatism is essentially a febrile disease. The term rheumatic fever, not infrequently applied to it, is pathologically appropriate. The term subacute rheumatism is here used to denote a form of the disease in which the fever and other symptoms are not sufficiently intense for an acute affection. Such cases occur without the continuance of the rheumatism sufficiently long for it to be considered as having become chronic. They are important from their liability to complications, and it seems proper to consider them in connection with the acute form.

Acute rheumatism occurs very rarely in infancy or childhood, and generally, for the first time, in youth or early manhood. At the outset, shiverings occur, and, in a certain proportion of cases, there is an initial chill. Coincident with, and sometimes preceding, the arthritic manifestations, the temperature rises, and, in tolerably severe cases, it reaches, within twenty four or thirty-six hours, a considerable elevation, namely, from 102° to 104°. As a rule, a greater or less number of joints are affected simultaneously or successively. The affection may suddenly disappear from joints which were the seat of the early manifestations, and as suddenly appear in others. It may reappear in joints from which it had disappeared. Usually corresponding joints on the two sides are affected, either together or in quick succession. It is rare for the affection to be limited to joints which are not analogues, for examples, the elbow on one side and the wrist of the other side, a knee and an ankle on opposite sides, etc. With some exceptions the disease is bilateral, and symmetrical in its local manifestations. The arthritic affection causes pain on the slightest motion, the suffering being comparatively little if the limbs are completely at rest. The affected joints are tender to the touch. Those not deeply imbedded in muscles are somewhat swollen, and on the skin are irregularly defined patches of erythema. In rare instances a single joint only is affected (mono-arthritis). The rheumatic affection may embrace not only the joints, but the fibrous tissue of the hands, the instep, the nucha, and the back. The sclerotic coat of the eye is sometimes affected, and, according to Dr. T. H. Buckler, the joints of the ossicles of the ear. The fever, as a rule, is intense in proportion to the number of joints affected, and the intensity of the local symptoms. During the course of the disease, the fever often shows notable remissions, with a corresponding diminution in the intensity of the arthritic symptoms. Perspirations are generally marked, and emit a pungent, sour odor. Owing to the perspirations, the urine is scanty, and deposits a brick-dust sediment, consisting of uric acid crystals and the urate of soda. The intellect is unaffected, if there be no cerebral complication. The disease is self-limited, the duration varying from one to six or eight weeks, if left to pursue its course without treatment. It may be much prolonged by complications. It becomes chronic in a small minority of cases.

Subacute rheumatism is distinguished by the mildness of the arthritic symptoms, the increase of temperature, or fever, being slight, and with comparatively but little constitutional disturbance.

A notable hyperpyrexia distinguishes some cases, the thermometer showing a rise of from 107° to 111°. The disease may prove fatal, under these circumstances, without any grave local complication, death being attributable to the high temperature. These cases, which have been characterized as malignant, are extremely rare. Delirium, convulsions, and coma, are sometimes associated with the high temperature.[1]

The diagnostic characters embraced in the foregoing outline are so distinctive of the disease, that there is seldom difficulty in its recognition. It is to be discriminated from gout. The differential features, which are not lacking in distinctiveness, will be stated in connection with the latter disease. Other affections with which it may be confounded are, a local synovitis, pyæmia, and the so-called gonorrhœal rheumatism.

Synovitis is usually confined to a single joint. The differential diagnosis, therefore, chiefly relates to its discrimination from mono-arthritic rheumatism. In most instances the synovitis follows an injury of some kind, that is, it is traumatic. It is accompanied by greater effusion within the joint than takes place in rheumatism. The fever, if any be present, is purely symptomatic. The perspirations of rheumatism are wanting. In a doubtful case the diagnosis might be made positive by an examination of the blood for uricæmia, it being assumed that this condition does not exist in synovitis. Resort to this test, however, is seldom, if ever, necessary. Instances of synovitis are the spinal arthropathies to which attention was first called by the late Prof. J. K. Mitchell, in 1831 and 1833, examples of which have been recently reported by Dr. S. Weir Mitchell.[2] These authors, together with Alison, Charcot, Brown-Séquard, and others, have shown the occasional occurrence of inflammation of joints as consecutive to spinal disease and injury of nerve trunks. The antecedent existence of the latter, and the association with muscular atrophy, or paralysis, distinguish these cases from those of rheumatism.

Suppuration within different joints occurs in pyæmia. This disease, in the diagnosis of rheumatism, is to be excluded by the absence of local suppuration, wounds, or injuries, together with the puerperal state, which stand in a causative relation to it. The symptoms in pyæmia denote a graver affection than rheumatism. In the former there is often delirium, which is rare in rheumatism. The evidence of embolic pneumonia, present generally in the former, is absent in the latter.

---

[1] For illustrative cases, together with references to others which have been reported, *vide* Papers by H. Weber, Murchison, and Sanderson, in the Trans. of the Clinical Society of London, vol. i. 1868. Also, cases reported by Southey and Greenhow, in ibid., vol. vi., 1873.

[2] Spinal Arthropathies, by S. Weir Mitchell, in Am. Journ. of Med. Sciences, April, 1875.

In the so-called gonorrhœal rheumatism, a single joint is only affected in the majority of cases. The local symptoms are those of synovitis as contrasted with a rheumatic affection. There is no shifting of the arthritic affection from joint to joint as in cases of rheumatism. These points of distinction, taken in connection with a coexisting gonorrhœa or gleet, suffice to show that the affection is not rheumatic, and their absence is sufficient for its exclusion.

The painful affection of joints occurring in women, and first described by Brodie, as hysterical or neurotic, is readily excluded by the absence of fever, and of local symptoms denoting an inflammatory condition.

Complications of Acute and Subacute Rheumatism.

The most frequent of the complications of rheumatism are pericarditis and endocarditis. Of these two affections the latter occurs most frequently, but the former is attended with far greater danger to life. Recovery from pericarditis, however, may be expected in the majority of cases. The immediate danger from endocarditis is almost *nil.* It is, however, of great importance, as being often the point of departure for slowly progressing changes which result in serious valvular lesions after the lapse of many years. As a rule, with pericarditis is associated endocarditis. The danger of the occurrence of these complications is perhaps in proportion to the acuteness of the rheumatism; yet, they occur in cases of the subacute form of the disease. The liability to them, as well as to the recurrence of attacks of rheumatism, diminishes after forty years of age. They are sometimes developed prior to the affection of the joints.

The diagnosis of pericarditis is to be based upon the occurrence of a pericardial friction murmur (*vide* page 200). This may be wanting if a patient be not seen until after several days from the date of the occurrence of this complication. The signs of pericardial effusion (*vide* page 200) will then serve for the diagnosis.

The proof of endocarditis is a mitral systolic murmur originating during the progress of the rheumatism. If a patient have this murmur when examined for the first time, it is insufficient evidence of endocardial inflammation, because it may have existed prior to the rheumatic attack. This is very probable if the patient have previously had rheumatism. The probability of its having been an antecedent murmur is great if the murmur denote mitral insufficiency, or if it be accompanied by a mitral direct murmur. The latter, and also a true mitral regurgitant murmur, denote valvular lesions which are not produced within a short period by endocarditis. The mitral murmur which is diagnostic of an existing endocardial inflammation, assuming that previous valvular lesions did not exist, is systolic, and intra-ventricular or non-regurgitant. It has its maximum of intensity over the body of the heart, and is not transmitted much beyond the præcordia. Moreover, the aortic and the pulmonic sound preserve their normal relation to each other as regards intensity.

An aortic direct murmur is never adequate evidence of endocarditis. This exists as a hæmic murmur in a large majority of cases, and in women almost always. An aortic regurgitant murmur, of course, denotes a valvular lesion which antedated the rheumatic attack.

Bronchitis, pleurisy, and pneumonia are rarely associated with rheumatism. Meningitis is an occasional complication (*vide* page 489). The author has observed a case in which peritonitis occurred ending in recovery. It might be considered *à priori* highly probable that cerebral embolism, caused by the detachment of masses of lymph from the valves within the left ventricle, would not be extremely rare. Clinical observation shows that it occurs so infrequently that there is little ground for apprehension on this score. The author has reported a case of sudden death from embolism of the pulmonary artery, and a few cases have been reported by others.

Treatment of Acute and Subacute Rheumatism.

Rheumatism tends intrinsically to recovery after a self-limited duration varying from a week to two months. The author was the first to establish these facts by recording, in 1862, thirteen cases which were allowed to pursue their course without medicinal treatment.[1] The facts were corroborated in a paper published in Guy's Hospital Reports (1865) by Dr. Henry G. Sutton, giving the results of a similar study of forty-one cases. A comparison of the results of the analysis of thirteen cases without treatment, with the results in twenty-four cases treated after different methods, and analyzed by the author in 1854, showed a maximum duration in the latter cases of less than four weeks, and a considerably less average duration than in the former group of cases. Hence the methods of treatment in vogue prior to 1854 shortened the duration of the disease. In estimating the effect of any method of treatment, it is evident that due allowance is to be made for the self-limitation and the intrinsic tendency of the disease. To cut short the disease, and, if this be not accomplished, to abridge its duration, are, obviously, important objects of treatment. There is an object more important than the latter of these, namely, to prevent the cardiac complications.

The "alkaline treatment" for the past twenty years has been generally relied upon in this country. If promptly and efficiently employed, it shortens somewhat the duration of the disease, and lessens very considerably the liability to pericarditis and endocarditis. These statements are based on ample data. To be effective, the alkaline remedy should be given in full doses, at short intervals, until alkalinity of the urine is produced. One or two drachms of the bicarbonate of soda or potassa, repeated every four hours, will render the urine alkaline in from twelve to twenty-four hours. These doses are generally well tolerated by the stomach if given during effervescence with citric acid or lemon-juice. After alkalinity of the urine is produced, the doses may be much diminished, but they should be sufficient to keep the urine alkaline. The good results of the alkaline treatment are not obtained unless it be pursued in this efficient way. Small or moderate doses are of little or no use.

---

[1] *Vide*, "A Contribution toward the Natural History of Articular Rheumatism," Am. Journ. of Med. Sciences, July, 1863.

A recent method of treatment is by salicin, or the salicylic acid. Salicin was introduced as a remedy in this disease by Dr. Maclagan, in 1876. Given in doses of from 15 to 30 grs., repeated every two or three hours, it sometimes proves an abortive remedy, and in the majority of cases, within twenty-four or forty-eight hours, the fever, together with pain and other local symptoms, is notably diminished if the disease be not arrested. After the cessation of pain and fever, the remedy should be continued, in doses somewhat lessened, for a week. Should the fever and pain return, the full doses are to be resumed.[1] Clinical observation appears to show that salicylic acid or the salicylate of soda has, at least, as much control of the disease as salicin, and they are now to a great extent used as substitutes for the latter. They are more apt to cause gastric disturbance, and to occasion considerable diaphoresis. The salicylic acid or the salicylate of soda may be given in scruple doses, repeated every two, three, or four hours, according to the intensity of the fever and local symptoms. They are to be continued until arrest of the disease or notable improvement has taken place. It remains to be determined by further clinical experience, whether preference is to be given to these over salicin.

The employment of these remedies in the treatment of rheumatism, is an event in practical medicine of not a little importance. They have a decided curative influence in a large proportion of cases. From his own observations, however, as well as the testimony of others, the author is led to think that these remedies are not preventive of the heart complications, except in so far as they abridge the duration of the disease. They should not, therefore, displace, but be associated with, the alkaline treatment. The latter is to be pursued precisely as before the introduction of these remedies. The salicylic acid is often given in conbination with an excess of alkali. But it is better not to attempt to combine the two in the same prescription, because it may be advisable either to diminish or increase the doses of one and not of the other.

Quinia in full doses is a useful remedy in this disease, but without the curative effect often obtained from salicin or the salicylic acid. Opiates are invaluable as palliatives, except in cases in which they are not well tolerated, or when the temporary relief is overbalanced by unpleasant after-effects.

Remedies which in time past were considered to have a curative effect in rheumatism, have now, for the most part, gone out of use. Among these are colchicum and the nitrate of potassa. The curative effect of these remedies was over-estimated, because due allowance was not made for the self-limited duration of the disease. They doubtless shortened the disease, and diminished its severity; but they have given way to other remedies of greater efficiency. There are several remedies which have recently been recommended as useful. One of these is the bromide of ammonium recommended by Prof. Da Costa. Dr. J. Russell

---

[1] For Dr. Maclagan's articles, *vide* London Lancet, March and October, 1876. For analytical notice of them, *vide* Am. Journ. Med. Sciences, Jan. 1877.

Reynolds obtained good results from the tincture of the chloride of iron, and the late Dr. Anstie regarded it as a valuable prophylactic. Trimethylamina has ardent advocates in France and Germany. Much utility from the syrup of lime is claimed by Dr. Buckingham, of Boston. Dr. Davies, of London, advises large blisters in the neighborhood of the affected joints, as a measure for abridging the duration of the disease, and preventing cardiac complications. Lemon juice, given largely, as advised by Dr. Rees, is still somewhat in use. Its utility justifies the free use of lemonade as a refreshing drink in cases of this disease.

Local measures of treatment are indicated to relieve pain and tenderness referred to the affected joints. Alkaline lotions with laudanum, the chloroform liniment, a lead and opium wash, and the tincture of aconite, each affords more or less relief. Surrounding the joints with cotton batting protects them from friction of the bedclothes and jarring movements. Extension of the limbs by pulleys and weights relieves by separating the articular surfaces. Rendering the limbs immovable by splints, or by bandages and plaster of Paris, may sometimes be resorted to. German writers—Stromeyer, Esmarch, Senator—recommend cold applications by means of wet compresses, and even ice. With the ideas of metastasis which formerly pervaded pathology, refrigerant applications would have been deemed hazardous, but experience shows that no harm follows this method of palliation. Simple friction with the hand, using some lubricating liniment, in some cases affords much relief, care being taken to increase the pressure only as it is borne without any suffering. The wet pack applied to the affected joints may be tried.

Hyperpyrexia furnishes an important indication. A temperature of 105° and over calls for antipyretic treatment. If not diminished by salicin or salicylic acid in antipyretic doses, quinia should be given, and the temperature reduced by cold sponging or the wet sheet, the latter measures repeated as often as the temperature rises. Inasmuch as hyperpyrexia is a source of danger, and, if excessive, denotes an imminent fatal tendency, the life of the patient may depend on carrying out, promptly, efficiently, and perseveringly, antipyretic measures. When, in connection with hyperpyrexia, the symptoms referable to the circulation denote asthenia or collapse, alcoholic stimulants are to be given freely. These should not be altogether withheld in cases of rheumatism which do not present dangerous symptoms, if patients have been accustomed to their use.

The treatment of pericarditis and endocarditis, occurring in connection with rheumatism, has been already considered (*vide* pages 202, 210).

Rheumatism involves a constitutional tendency to the disease. Few of those who experience it once, escape subsequent attacks. Persons having a predisposition to it should avoid exposures to cold and wet. Some exposure is apparently often the exciting cause of an attack, although, doubtless, the agency of cold as an etiological factor in this disease, is, in the minds of many, much exaggerated.

CHRONIC RHEUMATISM.

This name should be restricted to a chronic arthritic affection resembling acute rheumatism in the absence of a liability to suppuration or much effusion within the joints, and differing from so-called rheumatic gout or rheumatoid arthritis, in the absence of the deformities occasioned by the latter. Chronic rheumatism is not a febrile disease. The term rheumatic fever is not applicable to it. Nor, on the other hand, is it proper to regard it as a purely local disease. Considering that it is a sequel of acute rheumatism in a certain proportion of cases; that it has the same local characteristics, and that often several joints are affected simultaneously or successively, it is logical to infer the existence of a constitutional morbid condition which, if not identical with, is allied to, that determining the arthritic manifestations in rheumatic fever. In other words, an essential element in chronic rheumatism is a rheumatic diathesis. This pathological view has an important practical bearing, inasmuch as the treatment is to be based on the doctrine of a constitutional affection.

The affected joints are painful and tender, and those not imbedded in muscles somewhat swollen. Not infrequently an increase of heat over the joints is perceptible to the touch. The stiffness and soreness of the joints may render it necessary to avoid movements in which they are involved; or movements are more or less painful. The pain on motion is often greatest after a period of rest, especially in the morning. After some exercise the stiffness and soreness may diminish, and, perhaps, for a time, disappear. In some cases, at different times, different joints are affected; but in most instances the affection persists in the same joints. There is not that shifting from joint to joint which is a characteristic of acute rheumatism. There is no tendency in chronic rheumatism to pericarditis or endocarditis. The general condition of health, exclusive of the arthritic affection, may be excellent. The disease occurs in middle life oftener than in youth. Anchylosis of the affected joints and muscular atrophy sometimes take place. Patients are generally sensitive to changes in the atmosphere, and are able, by their sensations, sometimes to foretell the occurrence of wet or stormy weather.

The diseases to be excluded are synovitis—a purely local affection—and the so-called rheumatic gout. The latter will be noticed under a distinct heading after acute and chronic gout have been considered.

Treatment of Chronic Rheumatism.

When chronic rheumatism becomes established, it continues indefinitely, complete recovery taking place in a very small minority of cases. It continues usually with, from time to time, notable exacerbations or remissions. Acute rheumatism not infrequently occurs intercurrently. It has no tendency to a fatal result. It may even prolong life by serving as a prophylaxis against diseases favored by over-exertions and irregular habits of living.

It is an extravagant statement that treatment which is "meant to combat a rheumatic diathesis is wholly objectless." While it must be admitted that treatment very often fails, the measures proving in some instances useful, if not successful, are those which have for their object the removal of a diathetic condition. Various medicinal remedies are serviceable, each in a certain number of cases, and, with proper caution, they should severally be tried before coming to the conclusion that nothing is to be expected from drugs. The following are the more important of these remedies: Guaiacum, mercury in the form of the bichloride or the iodide, the iodide of potassium or ammonium, colchicum in small doses, the hydrochlorate of ammonia, arsenic, and sulphur.

Baths are often of great utility. Some patients are greatly benefited by the simple warm bath. Sea water is more likely to be beneficial; and sea salt may be added with advantage to the simple bath. The Turkish, Russian, and a domestic hot-air or vapor bath, if not contra-indicated by feebleness of the patient, in many cases proves beneficial, taken once or twice weekly. Hydropathy, that is, the wet pack, under competent supervision, is sometimes useful. Thermal springs, such as the Hot Springs of Virginia and Arkansas, do good to a certain proportion of the numbers who resort to them.[1] Mud or peat and sand baths are recommended by Senator and others. The hot sulphur baths are beneficial in some cases.

Rubbing the affected joints with anodyne and stimulating liniments—opodeldoc, volatile liniment, chloroform, aconite and laudanum added to the soap liniment, etc.—not only affords temporary relief, but, in many instances, is of permanent benefit. The rubbing doubtless has considerable agency in producing the good effect. Douches of tepid, fresh, or salt water applied to the joints is a useful measure in some cases. Blisters and the application of iodine are among the topical measures to be tried. Finally, cases should not be abandoned without a fair trial of electricity.

Intercurrent attacks of acute rheumatism are to be treated with salicin or the salicylic acid, and alkalies. The latter are often injudiciously continued for a long period in cases of chronic rheumatism. They are probably of little use except when the chronic is supplemented by the acute disease.

Patients residing in a rigorous, changeable, or humid climate, after general and local treatment have proved unavailing, should, if practicable, seek more favorable climatic influences. A cold climate which is dry and equable, is, perhaps, as likely to prove salutary as one within the tropics.

Indications pertaining to the general health, of course, claim attention. The diet should be simple and wholesome, but abundant. Starvation treatment does no good. The dietary should embrace milk, eggs, all kinds of vegetables, farinaceous articles, and fruit, with fish, poultry, and other kinds of animal food in moderate proportion. The highly seasoned dishes invented for the *gourmet* had better be avoided. Wines and spirits should be taken very moderately, and, as a rule, it is judicious to dispense with them.

---

[1] Senator gives a list of the numerous thermal springs in Germany and Switzerland which are places of resort for patients affected with chronic rheumatism, *vide* Ziemssen's Cyc., Am. ed., vol. xvi.

In the treatment of a disease which like this is sometimes either cured or favorably modified by some one of numerous remedies which in most cases are of no avail, this practical rule should be kept in mind, namely, each therapeutical measure deliberately entered upon, should be faithfully tested before being relinquished for another. Without the adoption of this rule, the treatment is almost certain to prove unsatisfactory.

ACUTE AND SUBACUTE GOUT.

Gout may be defined a constitutional disease, often hereditary, characterized by an arthritic affection generally occurring first in the metatarso-phalangeal joint of one of the great toes, but afterward extending to other joints both small and large, a deposit of the urate of soda taking place within and around the affected joints, the disease occurring in paroxysms, rarely developed before thirty years of age, affecting men much oftener than women, an essential morbid condition being an accumulation of uric acid in the blood.

A typical case of a primary attack of acute gout has strongly marked diagnostic features. The attack is sudden, occurring generally between midnight and daylight. The first symptom is pain in the metatarso-phalangeal joint of the great toe, oftener of the left than the right foot. The pain quickly becomes intense and often excruciating. It is compared by the patient to the pain supposed to be produced by the severest kind of local injury. It lasts for several hours, accompanied by fever, which is seldom very high, and then either abates or ceases, coincidently with more or less perspiration. This is the paroxysm. After it ends, the affected joint remains reddened, glazed, swollen, hot, extremely tender to the touch; the subcutaneous veins notably dilated, and some œdema of the areolar tissue. On the following night another paroxysm occurs. The paroxysms are repeated nightly for a week or ten days. They diminish in severity after a few days, and become comparatively mild before their disappearance. After they have ceased, the local symptoms disappear, a furfuraceous desquamation of the cuticle over the affected joint usually taking place. After such an attack, patients often declare that they feel much better than before its occurrence. This is partly attributable to the feeling of gratification arising from the cessation of suffering. The patient, however, is often actually better, for, in most cases, attacks are preceded by disorders of various kinds or a sense of *malaise*, of which he is relieved when the attacks are ended. The premonitions differ much in different cases, but they are apt to be uniform in the same case, so that patients are often able to predict with much certainty an impending attack.

Some persons are subject to these acute attacks after intervals of weeks, months, or years, in the intervals enjoying, perhaps, good health. It is rare for an attack not to be followed by other attacks sooner or later. Generally, in the intervals, subacute or imperfectly developed paroxysms are experienced more or less frequently, and sometimes these take place and continue to recur indefinitely without the occurrence of any acute paroxysms. These minor attacks are attended by considerable pain, with little or no swelling or other local symptoms, and fever being either slight or wanting.

Reciting the diagnostic points of acute gout, they are the age of the patient, a known hereditary predisposition, habits of life favorable to the development of the disease, the sudden nocturnal attack, the intensity of the pain, the joint affected, the œdema, dilated veins and subsequent desquamation, the remissions or intermissions with persistence of the local appearances. With a knowledge of these, a question as to the diagnosis can hardly arise in a typical case; and, when attacks have repeatedly occurred, there is little room for doubt when patients are first seen in an interval.

The character of the disease is less apparent when it is subacute or imperfectly developed, and, also, when there are deviations from the rule as regards the seat of its primary local manifestations. The small joints of the foot other than the metatarso-phalangeal of the great toe, the joints of the fingers, the instep, the heel, and the large joints, may be primarily affected. Such instances are extremely rare. Manifestations are seated in these different situations secondarily, that is, after repeated acute attacks, and they are common in cases of chronic gout; but instances are extremely rare before the character of the disease is sufficiently declared. In cases of doubtful diagnosis, age, hereditary predisposition, the paroxysmal recurrence of the local symptoms and their transient duration are points to be considered. Deposits of the urate of soda on the external ear are not infrequently found. The presence of these is diagnostic. The diagnosis is rendered probable by finding a notable deficiency of uric acid in the urine, and it is made positive by ascertaining an excess of uric acid in the blood-serum. Attacks of renal colic have some significance. Occupations which involve exposure to lead-poisoning are to be taken into account, it being established that gout may have this causation. The author has met with several hospital cases of gout in persons with no hereditary predisposition, and whose habits were not those causative of this disease, but who had suffered from other ailments attributable to lead.

Chronic Gout.

A primary attack of gout very rarely eventuates in the chronic form of the disease. As a rule, chronic gout is preceded by a greater or less number of acute attacks. The antecedent history, therefore, suffices to establish the diagnosis, when, from the local characters, there may be room for doubt. In most cases, however, the arthritic affections are sufficiently distinctive.

In some cases the local manifestations of the disease are limited to the small joints of the feet and hands; but oftener the larger joints become affected. The distinctive characters, however, are most conspicuous in the small joints. The affected joints are persistently more or less swollen, tender, and painful. These symptoms, at different times, are increased and diminished. Generally the patient is subject, after irregular intervals, to intercurrent acute attacks. An abundant deposit of the urates around the joints, in a certain proportion of cases, gives rise to swellings which, for a time, are soft to the touch. If these be opened, or if they open by ulceration, a mortar-like matter, or a thin liquid, in which white semi-solid masses are suspended, escapes. If their contents be not discharged, the swellings are diminished by absorption, and become hard. They now contain a chalk-like substance, which sometimes becomes exposed by ulceration. These tophaceous deposits, as they are termed, if numerous and large, produce stiffness, anchylosis, dislocations, and sometimes great deformity of the fingers and toes. The deposits abound in the urates, and are pathognomonic of gout, occurring in no other arthritic affection. When these are present there can be no hesitation as regards the diagnosis. They are not apparent in all cases. The affection is then to be differentiated from chronic rheumatism and the so-called rheumatic gout. Aside from points of difference pertaining to the local appearances, the antecedent history is almost invariably decisive. The instances are extremely rare in which there have not occurred, previously to the chronic disease, well-marked gouty attacks. The character of these can almost always be determined by non-professional description, if they have not been observed by the physician who is called upon to diagnosticate the disease after it has become chronic.

The disorders associated with chronic gout are somewhat distinctive. Dyspeptic ailments are generally frequent and prominent. The patient is subject to paroxysms of mental depression and irritability. Functional disturbance of the heart is common. Renal colic occurs often in gouty subjects. To determine how far the gouty diathesis is concerned in the causation of various local affections, such as bronchitis, eczematous eruptions, chronic nephritis (gouty kidney), etc., is not easy. Doubtless, heretofore the extent of the pathological relations of this diathesis was much exaggerated, and probably, at the present time, it is generally underestimated. But the discussion of the question, how far does the gouty diathesis enter into pathology and etiology, is without the scope of this work. Practically, however, the question is by no means to be ignored in the diagnosis and treatment of various affections.

Treatment of Gout.

The several objects of treatment, in cases of gout, may be embraced under the following heads: 1st. The treatment of acute gout; 2d. The prevention of attacks of gout; and 3d. The treatment of chronic gout.

Treatment of Acute Gout.

It seems to the author safe to assert, that an opinion held by many concerning the propriety of active medicinal interference in an acute attack of gout, is an erroneous one, based on a conjecture unsupported by evidence, and opposed by common sense. This opinion is, that the attack represents salutary efforts of nature which should not be interfered with. There is no solid foundation in clinical experience for such a doctrine. The objects of treatment are to relieve the patient as speedily as possible, and shorten the duration of the attack. Much can be done therapeutically to effect these objects. The severe pain should be relieved by some one of the preparations of opium. The promptness of action, when administered hypodermically, renders this method preferable if, as is usual, the pain be extremely intense. If administered by the mouth, the Dover's and Tully's powders are eligible preparations, in consequence of their diaphoretic effect. If the stomach be irritable, laudanum may be given per enema. The doses are to be graduated by the pain, and should be sufficient to afford relief, without, of course, incurring any risk of narcosis. A watery extract or infusion of opium may be applied to the affected joint. For shortening the duration of the attack, colchicum is emphatically the remedy. It has no succedaneum in this disease. It should be given as soon as practicable after the paroxysm, that is, at the beginning of the remission or intermission. Half a drachm of the tincture or wine of the colchicum seeds may be given at a dose, and repeated after intervals of three hours, until a moderate cathartic effect is produced. The efficacy of the remedy is not derived from catharsis, but the latter is evidence that it has been given to a sufficient extent. Active purgation and vomiting, together with other distressing effects, are not requisite, and should be carefully avoided. If subsequent nightly paroxysms recur, the remedy may be repeated. It is probably owing, in a measure, to the reluctance of many physicians to give to patients the full benefit of this remedy, that certain secret preparations have acquired such popularity—*e. g.*, Blair's pills—all of which doubtless owe what efficiency they have, chiefly to the colchicum which they contain. A part of the treatment, very far from unimportant, is the use of fluids largely. A carbonated alkaline drink is to be preferred, such as the Vichy or Appolinaris water. Water acidulated with lemon or orange juice may be taken freely. Simple pure water, in large quantity, is often in this, as in other diseases, highly efficient in promoting elimination by the kidneys and skin.

Aside from the foregoing treatment, it is needless to specify symptomatic indications proper to individual cases, which may call for remedies.

The Prevention of Attacks of Gout.

The objects falling under this heading are, removal of the gouty cachexia, and warding off an impending attack. If the former of these objects be effected, the latter is, of course, thereby disposed of. The gouty diathesis is rarely, if ever, extinguished. But it may often be kept in abeyance, and the cachexia prevented.

The diathetic treatment, as it may be called, must have reference to the causes of the diathesis and the cachexia, so far as they are known. A strong hereditary predisposition, it is difficult to cope with. The evidence of its existence is the occurrence of the disease early in life, and independently of the causes of the diathesis when it is acquired. As is well known, the diathesis is seldom acquired by the poorer and the so-called laboring classes of society. Cases of gout are much oftener seen in large cities than among rural populations. Aside from inheritance, gouty patients are chiefly those endowed with strong digestive powers, and addicted to the pleasures of the table. A preponderating animal diet, especially of the strong meats, highly seasoned dishes, and the free use of wine or malt liquors, conjoined with sedentary habits, lead to the acquirement of the gouty diathesis. The diathetic treatment, therefore, consists of proper modifications of habits of living in respect to these causes. The diet should embrace a larger relative proportion of vegetable food, poultry, fish, and young meats. The culinary preparations should be plain and wholesome, but by no means coarse or poor. Wines and malt liquors, as a rule, had better be dispensed with, and, if necessary, spirit, in moderate quantity, taken instead. Physical activity should, to a certain extent, take the place of sedentary habits. In carrying out these hygienic reforms, of course the co-operation of the patient is requisite; and this is often an insuperable obstacle. On the other hand, the reforms may be carried too far. The dietetic restrictions should never extend below the nutritive needs of the system. Physical activity should never be so great as to lead to exhaustion. If possible, the changes should be so made as not to involve a great hardship. Here is scope for the exercise of judgment and tact on the part of the medical adviser. The arrangement of a diet ample and satisfactory to the appetite, as well as the wants of nutrition; contrivances to secure a proper amount of exercise with enjoyment—these ends are desirable, and if not secured, the patient will be likely not to persevere.

In order to ward off impending attacks, it is, of course, essential to know that they are impending. Patients who have had several attacks are often able to judge of this with considerable accuracy, from sensations which, in their experience, have proved premonitory. There are no laws of periodicity to serve as guides. Examinations of the urine with reference to a deficient elimination of uric acid, and of the blood with reference to uricæmia, may be resorted to.

The objects of treatment are the neutralization of the uric acid in the blood, and its elimination by the kidneys and skin. The former of these objects is effected by alkalies, including lithia. If active treatment be not indicated, the alkaline mineral waters (Vichy, Appolinaris) may suffice. If the liability to an attack seem to be great, the bicarbonate of potassa or lithia should be given in sufficient doses to render the urine alkaline. If distinct premonitions of an attack be present, colchicum is the most efficient preventive remedy. These remedies, it is true, do not reach the unknown essential pathological condition of which the accumulation in the blood of uric acid is an effect. They are limited to the latter, and they may perhaps secure only a temporary advantage; but we are not to be deterred from doing the good which lies in our power, because it falls short of that which it were desirable we should be able to do. To prevent an impending attack is to do a certain amount of good, albeit the prevention is but a postponement.

Treatment of Chronic Gout.

The objects under this heading are twofold, namely, as relating to the cachexia, and directly to the affected joints.

The indications relating to the cachexia are the same as when the object is to prevent attacks of gout. The bicarbonate of potassa and the carbonate of lithia, or mineral waters containing these, are indicated by the uricæmic condition; but discretion is to be exercised in continuing their use. They should not be continued uninterruptedly for a long period. It is an useful precaution to suspend them for a week, after they have been continued for a couple of weeks. They should not be prescribed as a matter of course in chronic gout, but only when there is evidence of existing uricæmia. Diuretic remedies are indicated in proportion as the urine is scanty and poor in urates. The efficiency of pure water, taken in abundance, on an empty stomach, is not to be overlooked. The undoubted utility, in various diseases, of the Missisquoi and the Bethesda spring water, which are extensively used in this country, exemplifies simply the remedial value of pure water. The cutaneous transpiration should be promoted by maintaining a comfortable warmth of the surface, and elimination by the skin may be increased by the tepid water or the hot-air bath and the wet pack.

The dietetic treatment for the prevention of attacks is indicated in cases of chronic gout. The body should be well nourished, and restrictions of diet which interfere with adequate nutrition are injudicious. As regards the use of wine and malt liquors, the rules are the same as those already stated. Living in the open air as much as practicable, and as much exercise as can be taken without increasing the arthritic affections or causing undue exhaustion, are to be advised.

Travelling, change of scene, and the exchange of a genial for a rigorous climate, are often of great service. Various mineral springs are famous as places of resort for patients affected with chronic gout. The different springs vary much in their medicinal constituents. Without denying that each in certain cases is of more or less utility, in general, the benefit which patients receive is chiefly attributable to the hygienic influences derived from change of scene and climate, relaxation and recreation, together with the more salutary diet and regimen generally adopted. The fact that, in visiting mineral springs, a much larger quantity of water is taken into the system, explains in a measure their beneficial effect.

It is needless to say that deficient appetite, disordered digestion, anæmia, and other coexisting affections, claim appropriate treatment.

In the treatment relating directly to the arthritic affections, anodyne and stimulating embrocations are to be employed. Gentle, long-continued friction is of use. The evidence of its usefulness is a sense of comfort produced thereby. Collections of liquid or semi-solid gouty deposit beneath the skin may be removed by making a small opening. As much exercise of the joints is advisable as can be taken without being followed by increased pain or soreness.

Rheumatic Gout. Rheumatoid Arthritis. Deforming Arthritis.

These terms are applied to a chronic inflammatory arthritic affection which has received various other names now so seldom used that it is not worth while to burden the memory with them. The term rheumatic gout expresses what the affection is not; it is neither gout nor rheumatism, but distinct from both. It should no longer be thus designated. The term rheumatoid arthritis expresses its inflammatory character and seat, together with a resemblance to rheumatism. This is an appropriate name, and it is generally used by writers in this country. German and French writers use the term deforming arthritis or polyarthritis, a name expressing, in addition to the pathological character of the local affection, the occurrence of characteristic deformities which constitute a diagnostic feature.

The following outline will embrace the prominent points in the clinical history of this arthritic disease: It rarely occurs before, and in most instances after, thirty years of age. It affects women much oftener than men. The joints of the fingers are primarily affected in the majority of cases, those of the thumb remaining unaffected. With rare exceptions, the joints on both sides are affected; the disease is thus symmetrical. The toes may be secondarily affected, but they often escape. The affection may extend to the larger joints, and to the different divisions of the spinal column. The development and progress of the affection is gradual. Pain is the first local symptom. This is followed by stiffness and enlargement of the extremities of the bones. There is little or no tenderness nor redness. Movements of the bones often give rise to crepitus in the affected joints. Nodular growths are apt to occur around the joints. The proximate soft parts become atrophied, and the tendons rigid.

The deformity of the hands is pathognomonic. From semi-dislocation of the joints and contraction of the tendons, the fingers are deflected laterally, in an outward direction. The affection of the larger joints leads to shortening of the limbs and various distortions. Affecting the spine it causes rigidity, curvature, and inability to rotate the head. Extending, as it sometimes does, over the greater part of all of the joints of the body, the deformities may be very great, and the condition of the patient, as regards voluntary movements, be rendered utterly hopeless.

The disease is, in most cases, steadily but slowly progressive. Sometimes it progresses to a certain extent, and then remains stationary for an indefinite period. It does not tend to destroy, and appears sometimes not to interfere with the duration of life. It may have existed, slowly progressing, and, perhaps, with intervals of arrest, for ten, twenty, or thirty years before death. Retrogression does not take place, and recovery, after the disease has led to deformities, is impossible. More or less improvement is, however, not uncommon. The disease is not incompatible with a healthy condition of all the functions of the body exclusive of the parts involved in the arthritic affection.

The diseases from which rheumatoid arthritis is to be differentiated, are chronic rheumatism and chronic gout.

Prior to the characteristic deformity of the hands, it would not be easy, from the local appearances, to distinguish the disease from chronic rheumatism. The differential diagnosis is to be made by reference to the following points: The disease does not follow acute rheumatism, as is true of a certain proportion of the chronic cases of that affection. If, therefore, acute rheumatism have preceded, the disease is probably not rheumatoid arthritis. The latter occurs most frequently after the period of life when primary attacks of rheumatism generally take place. Rheumatism, as a rule, affects the larger before affecting the smaller joints, the reverse being the rule in cases of rheumatoid arthritis. After the disease has progressed sufficiently to give rise to the characteristic deformity, there is no doubt as regards the diagnosis.

From chronic gout the differentiation is easy. That affection is almost always preceded by the characteristic gouty attacks. The absence of these goes far toward its exclusion. Gout affects the toes before the fingers, whereas in rheumatoid arthritis the latter are the primary seat of the affection in the great majority of cases. The characteristic gouty deposit never takes place in rheumatoid arthritis. The hereditary tendency to gout involves no predisposition to the latter affection. The habits of living which lead to the gouty diathesis are not causative of rheumatoid arthritis; on the contrary, the latter occurs oftener among those who are poor and hard-working. Rheumatoid arthritis occurs much oftener in women than men, the reverse being true of gout.

Treatment of Rheumatoid Arthritis.

The utmost to be hoped for in the treatment of this disease is, that its progress may be stayed or retarded, and that, as regards pain and mobility, there may be more or less improvement in the affected joints.

Colchicum, lithia, and the alkalies are of no use in the treatment. Salicin was apparently useful in a case in which, from time to time, there was a supervention of a moderately acute arthritis. The author has observed manifest benefit from the iodide of potassium. Painting the affected joints with iodine is recommended. Friction and movements of the affected joints, both active and passive, are advisable, being careful not to produce thereby increase of pain. Electricity has been found useful. It should be employed under the direction of those who have had practical experience in its therapeutical applications.

The general health is to be improved, if deteriorated, and kept at a maximum, by such remedies as may be indicated in individual cases, and by invigorating measures of hygiene.

V.

EPIDEMIC CHOLERA.

THE diagnosis, prevention, and treatment of epidemic cholera, are to be considered in the concluding portion of this work. Omitting the past history of this remarkable disease, and avoiding discussion of pathological and etiological questions, the consideration of the topics just named will require but a small space.

Diagnosis of Epidemic Cholera.

The disease in this country, as in most other countries, never occurs sporadically; the physician, therefore, is called upon to diagnosticate it only when it prevails as an epidemic. Under these circumstances, there is no room for doubt as to the diagnosis except in some cases at the outset. The recognition of the disease at this time is immensely important; the life of the patient may depend upon its being instantly diagnosticated.

The duration of cholera proper, that is, including the period only during which the choleraic symptoms continue, and excluding sequels, rarely exceeds twenty-four hours. It is sometimes considerably less. In this statement, the commencement of the disease is dated from the occurrence of the characteristic intestinal dejections. A premonitory diarrhœa occurs in the vast majority of cases. This is a fact of very great importance. The division of the disease proper into two stages, is based on the occurrence of symptoms which denote what is commonly known as the state of collapse. The first stage embraces the period before collapse occurs. This stage is sometimes extremely short, lasting, perhaps, but an hour, or even less. The disease ends with this stage if collapse do not take place; and it may often be arrested at this stage. If collapse have taken place, and the patient emerge from this state, in some instances nothing remains but general debility which is always great. But, in most instances, more or less fever follows, presenting often typhoid characters; dysentery occurs in some cases; uræmic coma may ensue, and other affections. These are sequels, rather than events, belonging to the disease proper. Hence, the stage of reaction, as it is called, is superfluous.

The symptoms in the state of collapse form a clinical picture by which the disease is at once recognized. The patient is completely indifferent to persons and things around him, as well as to his own condition. The face is shrunken and wrinkled, the eyes sunken, the skin dusky, and the prolabia cyanotic. The surface of the body is cold, and either dry or covered with a sticky perspiration. The tongue is cold to the touch, and the expired breath gives the sensation of coldness. The pulse is imperceptible at the wrist, and the heart-sounds may be scarcely perceived by auscultation. The thermometer shows a diminution of temperature below the normal minimum. The patient speaks in a husky whisper. At intervals he suffers from muscular cramps affecting especially the lower limbs. Dyspnœa is sometimes a source of suffering. The intellectual faculties are intact. There is never anxiety or appearance of apprehension. Often the only desire expressed is for cold drink.

The foregoing symptoms render the diagnosis unmistakable. Practically it is vastly less important in the stage of collapse than at the commencement of the disease. The disease proper commences with the occurrence of the so-called choleraic dejections. The premonitory diarrhœa should not be reckoned as a stage of the disease. During the prevalence of an epidemic, hundreds or thousands are affected with diarrhœa not eventuating in cholera. It is customary to call this diarrhœa *cholerine;* but it has nothing characteristic, not differing appreciably from the looseness of the bowels which is common when cholera does not prevail. The duration of the premonitory diarrhœa varies from a few hours to several days.

All observers compare the choleraic dejections to whey and rice-water in appearance. They are commonly called the "rice-water stools." They are devoid of coloration from bile-pigment, and have no fecal odor. They contain, in greater or less abundance, small white masses resembling particles of rice, which consist of mucus, epithelium, and a few blood-corpuscles. The frequency of the dejections and the quantity vary. In the rare instances in which they are wanting (*cholera sicca*), the intestines are found to contain, after death, more or less of the characteristic transudation.

The diagnosis of cholera is positive when it is ascertained that choleraic dejections have occurred, and not until then. This diagnostic proof is wanting in cases of the so-called "dry cholera;" and it may happen that, during the physician's visit, no dejections occur, those which have taken place not having been preserved for his inspection. Under these circumstances, a patient with diarrhœa should be considered and treated as having cholera. It is a fact of immense importance, to which reference will presently be made in connection with the prevention of the disease, that a patient with what is apparently only an ordinary feculent diarrhœa, is in momentary danger of cholera during its epidemic prevalence.

Prevention of Epidemic Cholera.

The objects to be considered under this heading are, the arrest of the premonitory diarrhœa, the prevention of the importation and dissemination of the special cause, or, in other words, cholera germs; the removal of conditions which favor the multiplication of these, and their destruction by disinfecting agents.

As regards the prophylaxis in individual cases, it may be said that while cholera is one of the most fatal, it is one of the most preventable of diseases. The proof is conclusive, that if, during the prevalence of an epidemic, diarrhœa be always instantly arrested, and simple precautions taken in respect to quiet, diet, etc., the danger of the development of the disease is exceedingly small. The great difficulty is in enforcing the practical application of this truth. Persons cannot be made to believe that a looseness of the bowels such as they have had many times, can be the forerunner of a disease which may destroy life within a few hours. Even physicians fall victims to the disease from the non-observance of this simple measure of prophylaxis. Indeed, it happens not infrequently that persons are slow to apprehend danger after choleraic dejections have ensued, and even when the disease has approached collapse. In order to carry out as efficiently as possible this method of prevention, it is not enough to give warning by newspaper publications, handbills, etc. The only reliable way is to organize a system of house-to-house visitations, to be made once or twice daily, and continued as long as the epidemic lasts, inquiring in every house, at each visit, if any inmate has diarrhœa, giving orally the needful directions, and supplying, if necessary, remedies.

The prophylactic treatment is simple. The diarrhœa is quickly arrested by some form of opiate, with which may be combined capsicum, camphor, chloroform, and an astringent remedy. Rest and recumbency are to be enjoined, and abstinence from food for a few hours; after which light, digestible nutriment may be allowed. During the prevalence of an epidemic it is important for physicians or health boards to recommend some preparation containing opium, with accompanying instructions, to be used at once before medical advice can be obtained.

Cholera is an exotic disease. Were the germs to be excluded, it would never occur in this country. It is needless to characterize the prevention of their importation as vastly important. The practical question is, how to effect the exclusion of the germs. As commercial and social intercommunication with other countries cannot be suspended, the object is to be effected by the thorough disinfection of vessels coming from ports where cholera prevails. This should be done under proper quarantine regulations enforced by law. The cleansing and ventilation of vessels are not sufficient; they should be subjected to a disinfecting agent which will destroy the cholera germs. Nor is it enough to confine the disinfection to vessels on which, during the voyage, cases of cholera have occurred. A vessel may carry germs which have not multiplied sufficiently to produce cholera before reaching port, or, the period of incubation may not have passed. The fact of coming from a place where cholera prevailed should render disinfection a legal requirement. The disinfection should include clothing, baggage, cargo, and vessel. Detention is necessary only until this has been done, and persons need not be quarantined after their clothing and baggage have been properly disinfected. There is good ground for the belief that if thorough disinfection were rigidly enforced, the importation of cholera would be prevented, and then, of course, there would be no occasion for other preventive measures.

After the disease has been introduced, the dissemination from place to place, by means of intercommunications, can hardly be prevented, owing to the difficulty of disinfecting everything which may serve as carriers of the germs. This should be done as far as possible. Arrangements should be made in every town for preventing the reception of merchandise and personal effects from places where cholera prevails, without disinfection, or they should be quarantined until all danger from transported germs has passed.

These measures for preventing the importation and dissemination of cholera, are based on the belief that it is in no sense communicable, that is, it is not a miasmatic contagious disease, but that the special cause produced outside of the body, is portable, being transported by things, not persons, although sometimes in such a way as to give the appearance of its being a contagium. To these views it may be added, that living organisms probably constitute the special cause, as implied by the use of the term germs, it being understood, however, that, in the existing state of knowledge, the term may be used for the sake of convenience, and representing as highly probable, but not as yet satisfactorily demonstrated, the parasitic theory.

If the importation and dissemination of cholera be not prevented, the conditions favorable to their multiplication can, to a greater or less extent, be controlled. Facts abundantly show that collections of decomposing vegetable and animal matter, accumulated filth of any description, an undrained soil, ground polluted by sewage and excrement, houses permeated with sewer gases, apartments overcrowded and illy-ventilated, etc., furnish these conditions. These are localizing causes. Probably, they also act as auxiliary causes upon individuals, by increasing the susceptibility to the special cause. Hence, much can be done toward restricting the prevalence of the disease, by sanitary measures having reference to the removal of these conditions. It is far better to resort to these measures in anticipation of an epidemic, than to defer them until its advent. To particularize the requirements falling under this division of the subject, would lead to details which belong to public hygiene. It must suffice here, in general terms, to impress their importance.

In this connection the measures to be taken by individuals for self-protection may be referred to. There is no special plan of diet or regimen on which persons can rely for security against the disease, if they remain in an infected locality. Regular, temperate habits of life, and the observance of personal hygiene, are to be inculcated. It is an error to suppose that a restricted diet diminishes susceptibility to the disease. The reverse of this is more probable. Excesses in eating and drinking are to be avoided, together with over-fatigue and exhaustion. Removal without the area of infection is to be advised, if this be consistent with duty. The latter consideration will prevent the physician from deserting his post. The enforced removal of local populations is sometimes advisable. The special cause of the disease may enter the system with the inspired atmosphere, or with the ingesta. In order to avoid the possible introduction by means of drinking water, it should be brought from a distant source, or, if this be not practicable, the germs which it may contain should be destroyed by boiling. It is well to test drinking water for impurities, but it is possible that cholera germs may not be revealed by the ordinary tests. Milk, which has been found to be a means of introducing the germs of typhoid fever, may also convey those of cholera.

Finally, after cholera has obtained a foothold, it may be "stamped out" by disinfecting agents. For the proof of the correctness of this statement, it is only necessary to refer to the reports of the Metropolitan Board of Health of the City of New York, for the years 1866 and 1867. In 1866 more than a thousand cases of cholera occurred in numerous localities more or less widely separated. The measures adopted by the Board of Health for stamping out the epidemic by disinfection, were as complete as possible. A well-appointed disinfecting corps was organized, and at instant call night or day, provided with every requisite, and the means of transportation, without any delay. The result is contained in the following quotation from the Report of the Registrar of Vital Statistics, Dr. Elisha Harris: "*In three hundred and sixty-two houses*, where individual persons or families were smitten by cholera, but which were promptly brought under full sanitary control by disinfection and local purification, the pestilence *did not extend beyond the family in which the first case occurred.*"

Disinfection, to be efficient, must be complete. From its incompleteness follow not only failures in stamping out the disease in the particular instances in which the imperfect attempts are made, but impaired confidence in it as a means of preventing the diffusion of the disease. The following account of the measures employed in this city in 1876, are quoted from the report by the late Dr. E. B. Dalton: "The process of disinfection consisted in putting sulphate of iron, either in saturated solution, or dry if used in wet places, in privies, in all vessels containing dejections from the bowels, and in all places where such dejections had been deposited. An ordinary privy, six feet in diameter and twelve feet deep, required twenty pounds of sulphate of iron for its thorough disinfection. All bedding and clothing soiled or used by the patient was boiled in a solution of permanganate of potassa, of the strength of one ounce to five gallons of water, for two hours, then removed and reboiled in pure water. For purifying the atmosphere of the room without incommoding the patient, chlorine was gradually set free by adding sulphuric acid to a mixture of binoxide of manganese and chloride of sodium. In addition to these measures, chloride of lime or Labarraque's solution of chlorinated soda was scattered freely about the rooms and walls of the house."

Tenement houses in which cases recurred were disinfected by fumigation with either chlorine or sulphurous acid gas. "The process was this: All tenants were removed from the house, being allowed to take out nothing more than the clothing then upon them. All the windows and chimneys were closed. The gas was then set free in quantity—if chlorine, by the addition of sulphuric acid to chloride of lime; if sulphurous acid, by the burning of sulphur in large open pans supported by long iron legs. The men employed commenced the process on the upper floors, and descended, leaving the pans in operation on the different floors, and finally closed the street door. The house thus filled with the gas was left undisturbed for from eight to twelve hours. It was then opened, freely aired, and, finally, the tenants allowed to reoccupy."

Vigilance in sanitary measures, and the employment of disinfecting agents in anticipation of danger, in 1867 and 1868, prevented the disease from gaining foothold in this metropolis, although it prevailed in different parts of Europe and of this country in these years.

They who share in opinions held by many at the present time, namely, that the intestinal dejections in cholera and the so called cholorine, contain either a virus capable at once of producing cholera, or organisms in an immature state, which, after further development without the body, become infecting agents, consider, of course, that the immediate disinfection of the stools is important above all other preventive measures, whenever cholera obtains a foothold in any locality. This measure is of less importance in the minds of those who believe the etiological views just stated to be unsubstantiated. To such a precautionary measure, however, there can be no objection, and it is to be advised not only in deference to current opinions, but because facts appear to render it probable

INDEX.

ABDOMEN, examination of, 263
Addison's disease, 182
Agraphia, 477
Akinesis, 479
Albuminuria, 405
    acute, 418
        treatment of, 420
Alcoholics, habitual use of, responsibility of physicians for, 52
Alcoholism, 635
Alimentation, rectal, 266
Anæmia, simple, 178
        treatment of, 179
    pernicious, 180
    lymphatic, 184
Anæsthesia, cutaneous, 462
    from paralysis of fifth pair of nerves, 465
    muscular, 466
        treatment of, 466
Analgesia, 462
Anasarca, 188
    in cardiac disease, 171
Anchylostomum duodenale, 182, 363
Aneurism, thoracic, 238
    abdominal, 242
    treatment of, 243
Angina pectoris, 226
        treatment of, 228
Anorexia, 346
    treatment of, 347
Anosmia, 472
Antipyretic measures of treatment, 674
Aortic lesions, diagnosis of, 214
Aortitis, 237
Aphasia, 476
Aphonia, hysterical, 163
    feigned, 164
Apoplectic coma, 497
Apoplexy, congestive, 498
    sanguineous, 499
    from meningeal hemorrhage, 500
    from hæmatoma of the dura mater, 501
    from thrombosis and embolism, 501
    from cerebral exhaustion, 503
    from uræmia, 504
    from insolation, 504
    treatment of, 505
Arthritis, rheumatoid, 776
        treatment of, 778
Ascaris lumbricoides, 358
    vermicularis, 359
Ascites, 301
Asthma, 141
    hay, 103
    treatment of, 142
Ataxia, 482
    locomotor, 567
        treatment of, 570
Athetosis, 616
Atmosphere, purity of, in the treatment of disease, 48
Atrophy, acute yellow, of liver, 370
    progressive muscular, 577
        treatment of, 579
Audition, symptoms relating to, in diseases of the nervous system, 472
Auscultation in diseases of the respiratory system, 74
    in diseases of the heart, 172

BASEDOW'S disease, 234
Baths, in treatment of fevers, 674
Bile, absence, deficiency, and excess of, in the intestinal dejections, 261
    ducts, obstruction of, 386
Biliary passages, diseases of, 386
Biliousness, 385
Blood, morbid conditions of, 167
    examination of, 168
    diseases of, 178
Brain, tumors of, 531
        treatment of, 537
    abscess of, 537
        treatment of, 539
    sclerosis of, 572
        treatment of, 575
    motor centres in, 484
Bright's disease, acute, 418
        treatment of, 420
    chronic, 422
Bronchial hemorrhage, 144
Bronchitis, acute, diagnostic symptoms of, 80
        local symptoms of, 81
        physical signs of, 83
        general symptoms of, 85
        treatment of, 90
    capillary, diagnostic symptoms of, 80
        local symptoms of, 81

- Bronchitis, capillary—
    - physical signs of, 84
    - general symptoms of, 85
    - treatment of, 91
  - fibrinous, 96
  - epidemic, 100
  - summer and autumnal, 103
  - chronic, 119
    - diagnostic symptoms of, 119
    - physical signs of, 120
    - treatment of, 121
  - fetid, 122
- Broncho-pneumonia, 97
- Bronchus, primary, obstruction of, 128
- Bronzed skin disease, 182
- Bruit de Diable, 176
- Bummers, 41

- CACHEXIA, malarial, 730
- Cæcitis, acute, 282
  - treatment of, 286
- Cæcum, vermiform appendix, inflammation of, 295
  - ulceration of, 309
- Calculi, renal, 441
  - biliary, 391
- Carcinomatous and other morbid growths within the chest, 135
- Cardiac disease, symptomatology of, 169
  - physical signs of, 171
- Cardialgia, 343
- Casts of renal tubes in urine, 409
- Catalepsy, 603
  - treatment of, 604
- Cephalalgia, 620
  - treatment of, 622
- Cerebral hyperæmia, 438
  - hemorrhage, 498
- Cerebritis, diffused, chronic, 524
- Cheyne-Stokes respiration, 70
- Chlorosis, 180
- Cholacystitis, 393
- Cholalithiasis, 393
- Cholera, sporadic, 355
    - treatment of, 356
  - infantile, 356
    - treatment of, 357
  - epidemic, 779
    - prevention of, 780
    - treatment of, 784
- Chorea, 604
  - treatment of, 605
- Circulatory system, diseases of, 167, 178
- Cirrhosis of lung, 124
  - of liver, 375
- Clavus hystericus, 621
- Clinical medicine, definition, ends, and scope of, 17
- Coccyalgia, 626
- Colic, intestinal, 338
    - treatment of, 338
  - hepatic, 389
    - treatment of, 391
  - lead, 335
- Colic—
  - renal, 438
    - treatment of, 440
    - prophylaixs of, 440
- Colon, ulceration of, 312
- Coma, 474
  - sudden or apoplectic, 497
    - from cerebral hyperæmia, 498
      - hemorrhage, 498
    - from meningeal hemorrhage, 500
    - from hæmatoma of the dura mater, 501
    - from thrombosis and embolism, 501
    - from cerebral exhaustion, 504
    - from uræmia, 504
    - from insolation, 504
    - treatment of, 505, 506, 507, 508
  - diseases giving rise to, slowly, 508
  - epileptic, 513
  - hysterical, 513
  - cataleptic, 514
    - treatment of, 514
  - alcoholic, 514
    - treatment of, 516
  - narcotic, 516
    - treatment of, 518
- Congestion, cerebral, 498
- Constipation, 351
  - treatment of, 351
  - prevention of, 353
- Consumption, pulmonary (*vide* Phthisis pneumonic), 114
- Contracture, 485
- Convulsions, 483
  - hysterical, 601
    - treatment of, 602
- Convulsive movements of muscles of the eyeball, 470
- Cough, varieties of, 62
- Cramps, 485
  - of lower extremities, 616
  - writers', 615
- Cretinism, 666
- Croup, true, 152
  - spasmodic, 160
- Cyanosis in cardiac disease, 170, 176
  - from congenital malformation of the heart, 226

- DEJECTIONS, intestinal, 255
    - lienteric, 255
    - watery, 255
    - mucous, 255
    - purulent, 257
    - bloody, 257
    - containing, portions of intestinal tube, 258
    - pseudo-membranous, 258
    - fatty, 259
    - gall stones in, 259
    - entozoa in, 260
    - foreign bodies in, 260

Dejections, intestinal—
absence, deficiency or excess of bile in, 261
Delirium, 475
tremens, 635
treatment of, 637
ebriosum, 635
Delusion, definition of, 635
Dementia, 664
Dengue, 736
Diabetes mellitus, 447
treatment of, 450
insipidus, 455
treatment of, 456
Diagnosis, methods in, 22
sources of error in, 40
Diaphragm, paralysis of, 147
tonic spasm of, 148
clonic spasm of, 148
Diarrhœa, 349
treatment of, 349
Digestion, functional disorders of, 339
acute disorders of, 339
treatment of, 340
chronic disorders of, 340
Digestive system, disease of, 249
Diphtheria, 705
prevention of, 706
treatment of, 708
Diplegia facialis, 546
Dipsomania, 639
treatment of, 640
Disease, alimentation in, 45
drink in cases of, 47
medicinal treatment in cases of, 49
hygienic treatment in cases of, 45
expectant treatment in cases of, 55
Diseases, simulation of, 41
of the respiratory system, 80
of the digestive system, 249
of the urinary system, 401
of the nervous system, 459
paralytic, 523
intra-cranial, 523
spasmodic or convulsive, 587
local, 613
treatment of, 617
neuralgic, 619
functional of nervous system, 630
mental, 652
treatment of, 666
general, 671
Dropsy, general, 188
treatment of, 189
peritoneal, 301
treatment of, 303
in malarial fever, 730
Duodenum, ulceration of, 307
Dying, different modes of, 51
Dysentery, acute, 281
treatment of, 284
subacute, 290
chronic, 290
treatment of, 291
Dyspepsia, chronic, 340
Dyspepsia—
treatment of, 341
Dyspnœa in cardiac disease, 170

ECLAMPSIA, 483
Embolism, 246
of pulmonary artery, 247
of arterial trunks of the systemic circulation, 249
Emphysema, pulmonary, 129
varieties of, 133
interlobular and subpleural, 132
atrophic or senile, 133
lobular, 132
Empyema, acute, 93
chronic, local symptoms of, 106
physical signs of, 107
general symptoms of, 109
treatment of, 112
circumscribed, 110
with spontaneous perforation of the chest wall, 111
Endocarditis, 207
ulcerative, 210
Enteralgia, 334
from lead, 335
treatment of, 387
Enteritis, acute, 280
treatment of, 283
subacute, 289
chronic, 289
Enterorrhagia, 257
Entozoa, intestinal, 260
Epilepsy, 593
treatment of, 597
Epileptoid paroxysms, 596
treatment of, 601
Erotomania, 663
Exophthalmic goitre, treatment of, 235
Expectant system in treating cases of disease, 55
Expectation as a therapeutic agent, 467
Expectoration, varieties of, 63
Exploratory puncture of the chest, 109
Eye, symptoms relating to, 467
ophthalmoscopic appearances in diseases of the nervous system, 471
Eyes, conjoint deviation of, 470

FACIES of anæmia and cyanosis, of renal disease, malaria, carcinoma, typhoid fever, acute peritonitis, etc. etc., 24, 25
Febricula, 677
Fecal tumors, 320
treatment of, 329
Fever, simple, continued, 677
ephemeral, 677
typhoid, 678
prevention of, 685
treatment of, 687
typhus, 695
prevention of, 697
treatment of, 697

Fever—
  relapsing, 697
    prevention of, 699
    treatment of, 699
  cerebro spinal, 700
    treatment of, 703
  miliary, 677
  diphtheritic, 705
    prevention of, 707
    treatment of, 708
  erysipelatous, 713
    prevention of, 714
    treatment of, 714
  pharyngeal, 715
  intermittent, benign, 716
      simple types of, 717
    compound types of, 718
    masked, 718
    latent, 719
    prevention of, 719
    treatment of, 720
  remittent, 722
  pernicious malarial, 723
    treatment of, 729
  hemorrhagic malarial, 724
  typho-malarial, 726
    treatment of, 729
  yellow, 731
    prevention of, 733
    treatment of, 734
  dengue, 736
    prophylaxis and treatment, 737
  scarlet, diagnostic, characters of, 738
    incubation of, 738
  stage of invasion of, 739
      eruption of, 740
      desquamation of, 743
  irregular forms, complications, and sequels of, 747
  prevention of, 757
  treatment of, 759
Fevers, 671
  nosological divisions of, 672
  diagnosis and treatment of, 677
  continued, 677
  infectious defined, 672
  periodical, 716
  malarial complications and sequels of, 720
  eruptive, 737

GALL-BLADDER, diseases of, 393
  treatment of, 394
Gall-stones, passage of, 389
    treatment of, 391
  in the intestinal dejections, 257
Gangrene, pulmonary, 133
Gastralgia, acute and chronic, 331
    treatment of, 332
Gastritis, acute, 278
  toxical, 280
    treatment of, 282
  subacute, 287
  chronic, 288
Gastro-enteralgia, 334
Gastrorrhagia, 252
Glands, cervical, scrofulosis of, 275
Glottis, œdema of, 157
  spasm of, 159, 162
  morbid growths within, 159
Glycosuria, 448
Goitre, 275
Goitre, exophthalmic, 234
Gout, acute and subacute, 771
    treatment of, 773
    prevention of, 774
  chronic, 772
  rheumatic, 776
Graves' disease, 234
Growths, morbid, within the chest, 137
Gustation, symptoms relating to, in diseases of the nervous system, 473

HÆMATEMESIS, 252
  treatment of, 253
Hæmatinuria, 407, 443
Hæmatomyelia, 550
Hæmatophilia, 197
Hæmaturia, 407, 443
Hæmoptysis, 63, 144
  treatment of, 145
  simulated, 145
Hallucination, definition of, 653
Hay fever, hay asthma, 103
Hearing, sense of, symptoms referable to, in diseases of the nervous system, 472
Heart, symptomatology of diseases of, 169
  pain in diseases of, 169
  disturbances of the action of, 169
  physical signs of diseases of, 171
  inflammatory diseases of, 198
  structural affections of, 212
  valvular lesions of, 212
  thrombosis of, 217
  lesions of the walls of, 219
  hypertrophy and dilatation of, 219
  diagnosis of enlargement of, 220
  differential diagnosis of hypertrophy and dilatation of, 221
  treatment of hypertrophy and dilatation of, 222
  fatty degeneration of, 223
      treatment of, 225
  congenital malformations of, 226
  functional disorder of, 230
  increased frequency of the action of, 230
  diminished frequency of the action of, 231
  intermittency of the action of, 231
  irregularity of the action of, 232
  reduplication of the sounds of, 232
  diagnosis of functional disorder of, 232
  treatment of functional disorder of, 233
  functional disorder of, associated with structural disease, 234

Heart-murmurs, 172
Heart-sounds, abnormal modifications of 172
Helminthiasis, 358
Hématimètre, 168
Hemicrania, 620
    treatment of, 622
Hemiparaplegia, 552
Hemiplegia, cerebral, 426, 480
        from cerebral hemorrhage, 527
            treatment of, 529
        from embolism and thrombosis, 530
            treatment of, 530
        from intra-cranial tumors, 531
            treatment of, 537
        from cerebral abscess, 537
            treatment of, 539
        functional, 540
        spinal, 552
Hemorrhage, meningeal, 500
Hepatalgia, 385
Hepatic colic, 389
        treatment of, 391
Hepatitis, acute, diffuse, or parenchymatous, 370
            treatment of, 371
    suppurative, 372
    abscess of, 372
        treatment of, 374
    chronic interstitial, 375
    syphilitic, 377
Hiccough, 148
Hodgkin's disease, 184
Hydatids within the chest, 138
    of the liver, 381
Hydropericardium, 207
Hydroperitoneum, 301
Hydrophobia, 607
Hydrothorax, 139
Hydruria, 402
Hygienic treatment in cases of disease, 45
Hyperæmia, cerebral, 498
Hyperæsthesia in diseases of the nervous system, 461
Hyperpyrexia, treatment of, 674
Hypochondrism, 646
    treatment of, 648
Hysteria, 631
    treatment of, 633
Hysterical convulsions, 601
        treatment of, 602

IDIOCY, 665
Ileum, ulceration of, 308
Illusion, definition of, 653
Imbecility, 665
Indigestion, chronic, 342
        treatment of, 344
Insanity, 652
    emotional and impulsive, 659
    varieties of, 654
    moral, 654
    as connected with jurisprudence, 670
Insomnia, 650
Inspection in cardiac diseases, 172
Intemperance, prevention of, 642
Intestinal obstruction with strangulation, 320
        without strangulation, 325
        treatment of, 327
Intestines, functional diseases of, 330
    inflammatory diseases of, 278
    cancer of, 315
    diseases of glands of, 329
Intra-cranial inflammatory diseases, 488
Intra-spinal inflammatory diseases, 496
Intussusception of intestine, 322
        treatment of, 344

JAUNDICE from obstruction of bile-ducts, 386
        treatment of, 389

KIDNEYS, diseases of, 417
    waxy disease of, 426
    suppurative inflammation of, 428
    cysts in, 434
    cancer of, 435
    hydatid disease of, 436
    tuberculous disease of, 437
    new formations in, 438
    congestion of, 444
    floating or movable, 446
Kleptomania, 663
Knee phenomenon, 487

LAGOPHTHALMUS, 543
Laryngeal muscles, paralysis of, 162
Laryngismus stridulus, 160
Laryngitis, simple acute and subacute, 149
        treatment of, 151
    pseudo membranous, 155
    chronic, 154
Laryngoscope in diseases of the respiratory system, 79
Larynx, disease of, 149
Lead in urine, tests for, 336
    colic, 335
    paralysis from, 585
        treatment of, 586
Leucocythemia, 185
    pseudo, 184
Liver, diseases of, 368
    inflammatory diseases of, 370
    acute parenchymatous inflammation of, 370
    abscess of, 372
    chronic interstitial inflammation of, 375
            treatment of, 377
    syphilitic disease of, 377
    structural diseases of, 378
    fatty, 378
    waxy, 279
        treatment of, 379

Liver—
  cancer of, 380
    treatment of, 383
  hydatid tumor in, 381
    treatment of, 383
  functional diseases of, 384
  congestion of, 384
  dislocation of, 369
  physical exploration of, 368
  disorders of the secretory and excretory functions of, 385
Lumbago, 629
Lumbricoid worms, 358

MALINGERERS, 41
  Mania, acute and chronic, 655
    homicidal, 660
    suicidal, 661
Measles, see Rubeola, 738
  German, 752
Mediastinal tumors, 137
Megrim, 621
Melancholia, 658
Melancholy, 645
  treatment of, 646
Ménière's disease, 643
Meningitis, simple acute cerebral, 488
      treatment of, 491
  tuberculous, 492
    treatment of, 495
  acute spinal, 496
    treatment of, 497
  chronic cerebral, 510
    treatment of, 512
  cerebro spinal, 700
Mensuration in cardiac disease, 172
Mental diseases, 652
    treatment of, 666
Metalloscopy, 466
Mind, symptoms relating to, in diseases of the nervous system, 474
  feebleness of, 476
Mitral cardiac lesions, diagnosis of, 213
Monomania, 656
Movements, reflex, 486
Murmurs, cardiac, 173
Muscæ volitantes, 468
Muscular movements, symptoms relating to, in diseases of the nervous system, 479
Myalgia, 629
  treatment of, 630
Mydriasis, 468
Myosis, 468

NECK, diseases of the glands of, 274
  Nephritis, acute parenchymatous,418
    treatment of, 420
  chronic parenchymatous, 422
    treatment of, 427
  interstitial, 424
    treatment of, 427
  suppurative, 428
    treatment of, 430
Nephro-lithiasis, 438
Nephro-phthisis, 437
Nervous system, diseases of, 459
      diagnosis and treatment of, 488
  exhaustion, 648
    treatment of, 649
Neuralgia, dorso-intercostal, 146
  of the fifth nerve, 623
  cervico-occipital, 624
  cervico-brachial, 624
  lumbo-abdominal, 625
    femoral, 625
  sciatic, 625
  of the genital organs, 626
Neuralgic diseases, 618
    treatment of, 626
Neuroses, 630
Nictitation, 470
Nystagmus, 470

OBSTIPATION, 354
  gastric and intestinal, 317
  intestinal, with strangulation, 320
    without strangulation, 325
Obstruction, functional, of the bowels, 354
Œdema, 188
  pulmonary, 140
  of the glottis, 157
  subglottic, 158
  in cardiac disease, 171
Œsophagus, diseases of, 272
  spasm of, 613
Olfaction, symptoms relating to, in diseases of the nervous system, 472
Ophthalmoscopic morbid appearances, 470
Opium habit, 52

PAIN in diseases of the nervous system, 459
  in diseases of the respiratory system, 70
  in cardiac disease, 169
  in diseases of the digestive system, 262
    within chest, 138
Palpation in cardiac disease, 171
Pancreas, disease of, 398
Paræsthesia, 462
Paralyses, cerebral, 523
  spinal, 549
  cerebro-spinal, 571
  myopathic, 577
Paralysis of orbital muscles, 469
  motor, 479
  cerebral, 480
  spinal, 481
  peripheral, 481
  functional, 481
  myopathic, 481
  motor, treatment of, 482

- Paralysis—
  - general cerebral, 524
  - affecting cranial nerves, 543
  - facial, 543
    - bilateral, 546
  - glosso-labial or bulbar, 546
  - general spinal, 549
    - from inflammation of the motor tract, 561
  - acute infantile, 562
    - treatment of, 563
  - from inflammation of the motor tract in the adult, 564
  - from sclerosis of the brain and cord, 572
  - treatment of, 575
  - unilateral spinal, 552
  - agitans, 576
    - treatment of, 577
  - pseudo-hypertrophic, 580
    - treatment of, 582
  - local, affecting spinal nerves, 583
    - treatment of, 584
  - from lead, 585
    - treatment of, 586
  - from other metals, 586
- Paraphasia, 478
- Paraplegia, 554
  - treatment of, 557
- Parasites, intestinal, 358
- Paresis. 479
- Parotiditis, 274
- Patients, modes of examining, 18
- Pentastoma constrictum, 138
- Percussion in diseases of the respiratory system, 73
  - in diseases of the heart, 171
- Pericarditis, acute, 199
    - diagnostic symptoms of, 199
    - physical signs of, 200
    - treatment of, 202
  - subacute and chronic, 204
  - pneumo-, 207
- Pericardium, hydro-, 207
- Perinephritic abscess, 428
  - treatment of, 430
- Peritoneal dropsy, 301
- Peritoneum, cancer of, 316
- Peritonitis, acute, 296
    - treatment of, 298
  - chronic, 299
  - circumscribed, 300
- Perityphlitic abscess, 309
  - treatment of, 310
- Pertussis, 100
- Pharyngitis, acute, 268
  - subacute, 269
  - chronic, 269
- Pharynx, diseases of, 268
- Phthisis, pneumonic, 114
    - diagnostic symptoms of, 115
    - physical signs of, 115
    - treatment of, 117
  - fibroid, 124
- Physicians, professional conduct of, 56
- Pleurisy, acute, diagnostic symptoms of, 80
    - local symptoms of, 81
    - physical signs of, 83
    - general symptoms of, 85
    - treatment of, 86
    - varieties of, 92
    - with pneumothorax, 94
  - circumscribed, 92
  - chronic, simple, diagnostic symptoms of, 105
      - local symptoms of, 106
    - physical signs of, 107
    - general symptoms of, 109
    - treatment of, 111
  - with pneumothorax, local symptoms of, 106
    - physical signs of, 110
    - treatment of, 113
  - circumscribed, with pneumothorax, 111
  - bilateral, 110
  - hemorrhagic, 110
- Pleurodynia, 146
- Pneumonia, acute, diagnostic symptoms of, 80
    - local symptoms of, 81
    - physical signs of, 83
    - general symptoms of, 85
    - treatment of, 87
  - embolic, 94
  - hypostatic, 95
  - broncho, 97
  - interstitial, 124
- Pneumothorax, 94
- Pulmonic artery, lesions of, 216
- Pulse, symptoms relating to, 25
  - increased frequency of, 26
  - diminished frequency of, 26
  - quickness and slowness of, 28
  - hardness and softness of, 29
  - fulness, smallness, weakness, and irregularity of, 30
  - abnormal characters of, in cardiac diseases, 170
  - venous, 176
- Pupils, morbid changes in, 468
- Purpura hæmorrhagica, 196
- Pyæmia, 192
  - treatment of, 193
- Pyelitis, 430
- Pyelonephritis, 430
- Pyonephrosis, 432
  - treatment of, 432
- Pyromania, 662
- Pyuria, 408

- QUINSY, 271

- RABIES, 607
  - treatment of, 610
  - prevention of, 611
- Records, clinical, 20

Rectum, ulceration of, 312
Reflex movements of tendons, 487
Regurgitations, 342
Renal cysts, 434
    cancer, 435
    colic, 438
    abscess, 429
Reports, clinical, 21
Respiration, symptoms referable to, 68
    Cheyne-Stokes, 70
Respiratory organs within the chest, acute diseases of, 80
        chronic inflammatory diseases of, 105
        structural diseases of, 126
        functional diseases of, 139
Respiratory system, diseases of, 61, 80
Rheumatism, muscular, 629
    acute and subacute, 763
        complications of, 765
        treatment of, 766
    chronic, 769
        treatment of, 769
Roseola, 752
Rötheln, 752
Rubeola, diagnostic characters of, 738
    incubation of, 738
    stage of invasion of, 739
        of desquamation of, 743
    irregular forms, complications and sequels of, 745
    sine catarrho, 745
    nigra, 746
    prevention of, 756
    treatment of, 756

SCARLATINA, see Fever, scarlet, 738
    anginosa, 747
Sciatica, 625
        cerebro-spinal, 572
Sclerosis, pulmonary, 124
Scorbutus, 194
    treatment of, 195
Scrofula, 275
Senses, special, symptoms relating to, 467
Sensibility, general, symptoms relating to, 459
Septicæmia, 192
    treatment of, 193
Signs obtained by percussion in diseases of respiratory system, 73
        by auscultation, 74
        by inspection, palpation, and mensuration, 78
        by succussion, 79
Sleeplessness, 650
Smallpox, see Variola, 738
Smell, sense of, in diseases of the nervous system, 472
Somnolency, 475
Spasm of facial muscles, 613
    of muscles of the neck, 615
        of upper extremities, 615
        of lower extremities, 616
Spasms, 483
Sphygmograph, account of, 25
Spinal irritation, 651
Spleen, diseases of, 395
    abscess of, 397
    waxy degeneration of, 397
    carcinoma of, 397
    treatment of diseases of, 398
    enlargement of, in malarial fever, 730
Splenitis, 397
Sputa, varieties of, 65
Stomach, inflammatory diseases of, 278
    phlegmonous inflammation of, 286
    ulceration of, 305
        treatment of, 306
    cancer of, 312
        treatment of, 315
    obstruction in, 317
    dilatation of, 317
        treatment of, 319
    diseases of the glands of, 329
    functional diseases of, 330
    neuralgia of, 331
Strychnia, poisoning by, 590
        treatment of, 592
Sugar in urine, tests for, 448
Suicidal insanity, 661
Symptomatology the chief source of the data for diagnosis, 22
Symptoms relating to the general aspect of patients, 23

TÆNIÆ, or tape-worms, 360
        treatment of, 361
        prevention of, 363
Taste, sense of, in diseases of the nervous system, 473
Temperature, symptoms relating to, 32
    rules in taking, 33
    of hospital wards and sick-rooms, 47
Tetanus and tetanoid spasms, 587
            treatment of, 590
Therapeutics, sources of error in, 53
Thermometers, clinical, 32
Thermometry, normal, 33
    in disease, 34
Thread-worm, 359
Thrombosis, 246
    of veins, 246
    of arteries, 247
Tic douloureux, 624
Tinnitus aurium, 472
Tongue, symptoms relating to, 36
Tonsillitis, 271
Trachea, obstruction of, 127
Tracheotomy in acute laryngitis, 151
    in pseudo-membranous laryngitis, 154
    in chronic laryngitis, 156
    in œdema of the glottis, 158
    in paralysis of laryngeal muscles, 164
Treatment in cases of disease, objects in, 42
    abortive and curative, 43
    palliating and supporting, 44
    hygienic, 45

Tremor, 486
Trichina spiralis, 365
        treatment of, 366
        prophylaxis of, 367
Tricocephalus dispar, 364
Tricuspid lesions of heart, diagnosis of, 215
Tuberculosis, acute miliary, 123
Tumors, mediastinal, 137
    abdominal, 265
    of brain, 531
        treatment of, 537
Tympanites, 343
Typhlitis, acute, 282
        treatment of, 286
    subacute and chronic, 294

URÆMIA, 410
    treatment of, 414
Urea, amount of, in urine, 404
Urinary system, diseases of, 401
Urine, examination of, for lead, 336
    symptoms relating to, 401
    quantity, specific gravity, reaction, and general appearance of, 402
    albumen in, 405
    blood in, 407
    pus in, 408
    casts and epithelium in, 409

VACCINATION, 751
    Vaccinia, 750
Valvular lesions of the heart, 212
        treatment of, 216
Varicella, 748
Variola, diagnostic characters of, 738
    incubation of, 738
    stage of invasion of, 739
        of eruption of, 740
        of desiccation of, 743
    irregular forms, complications, and sequels of, 744
    prevention of, 754
    treatment of, 754
Venous hum, 176
Vermiform, appendix of the cæcum, inflammation of, 295
Vertigo, 642
    treatment of, 644
Vessels, blood, symptoms and signs referable to, 175
        diseases of, 237
Vision, symptoms relating to, 467
Voice, symptoms relating to, in diseases of the respiratory system, 71
Vomiting, 249
    serous or watery, 251
    of pus, 251
    of blood, 252
        treatment of, 253
    bilious, 254
    fecal, 254
    from indigestion, 342
    a functional disease, 347
    treatment of, 348

WET pack, 675
    Whooping-cough, 100
Worms, intestinal, 358
Writers' cramp, 615
        treatment of, 618

HENRY C. LEA'S

(LATE LEA & BLANCHARD'S)

CLASSIFIED CATALOGUE

OF

MEDICAL AND SURGICAL PUBLICATIONS.

In asking the attention of the profession to the works advertised in the following pages, the publisher would state that no pains are spared to secure a continuance of the confidence earned for the publications of the house by their careful selection and accuracy and finish of execution.

The printed prices are those at which books can generally be supplied by booksellers throughout the United States, who can readily procure for their customers any works not kept in stock. Where access to bookstores is not convenient, books will be sent by mail post-paid on receipt of the price, and as the limit of mailable weight has been removed, no difficulty will be experienced in obtaining through the post-office any work in this catalogue. No risks, however, are assumed either on the money or the books, and no publications but my own are supplied, so that gentlemen will in most cases find it more convenient to deal with the nearest bookseller.

An ILLUSTRATED CATALOGUE, of 64 octavo pages, handsomely printed, will be forwarded by mail, post-paid, on receipt of ten cents. HENRY C. LEA.

Nos. 706 and 708 SANSOM ST., PHILADELPHIA, October, 1879.

INCREASED INDUCEMENT FOR SUBSCRIBERS TO

THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES.

TWO MEDICAL JOURNALS, containing nearly 2000 LARGE PAGES,

Free of Postage, for FIVE DOLLARS Per Annum.

TERMS FOR 1880.

THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES, published quarterly (1150 pages per annum), with
THE MEDICAL NEWS AND ABSTRACT, monthly (768 pp. per annum), } Five Dollars per annum, in advance.

SEPARATE SUBSCRIPTIONS TO

THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES, when not paid for in advance, Five Dollars.

THE MEDICAL NEWS AND ABSTRACT, free of postage, in advance, Two Dollars and a half.

⁂ Advance-paying subscribers can obtain at the close of the year cloth covers, gilt-lettered, for each volume of the Journal (two annually), and of the News and Abstract (one annually), free by mail, by remitting ten cents for each cover.

It will thus be seen that for the moderate sum of FIVE DOLLARS in advance, the subscriber will receive, free of postage, the equivalent of three or four large octavo volumes, stored with the choicest matter, original and selected, that can be furnished by the medical literature of both hemispheres. Thus taken together, the "JOURNAL," and the "NEWS AND ABSTRACT" combine the advantages of the elaborate preparation that can be devoted to the Quarterly with the prompt conveyance of intelligence by the Monthly; while, the whole being under a single editorial supervision, the subscriber is secured against the duplication of matter inevitable when periodicals from different sources are taken together.

The periodicals thus offered at this unprecedented rate are universally known for

(For "THE OBSTETRICAL JOURNAL," see p. 24.)

their high professional standing.

I.

THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES,

Edited by I. MINIS HAYS, M.D.,

for more than half a century has maintained its position in the front rank of the medical literature of the world. Cordially supported by the profession of America, it circulates wherever the language is read, and is universally regarded as a national exponent of American medicine—a position to which it is entitled by the distinguished names from every section of the Union which are to be found among its collaborators.* It is issued quarterly, in January, April, July, and October, each number containing about three hundred octavo pages, appropriately illustrated wherever necessary. A large portion of this space is devoted to Original Communications, embracing papers from the most eminent members of the profession throughout the country.

Following this is the Review Department, containing extended reviews by competent writers of prominent new works and topics of the day, together with numerous elaborate Analytical and Bibliographical Notices, giving a fairly complete survey of medical literature.

Then follows the Quarterly Summary of Improvements and Discoveries in the Medical Sciences, classified and arranged under different heads, and furnishing a digest of medical progress, abroad and at home.

Thus during the year 1878 the "Journal" contained 77 Original Communications, mostly elaborate in character, 133 Reviews and Bibliographical Notices, and 255 articles in the Quarterly Summaries, illustrated with 48 maps and wood engravings.

That the efforts thus made to maintain the high reputation of the "Journal" are successful, is shown by the position accorded to it in both America and Europe as a leading organ of medical progress:—

> This is universally acknowledged as the leading American Journal, and has been conducted by Dr. Hays alone until 1869, when his son was associated with him. We quite agree with the critic, that this journal is second to none in the language, and cheerfully accord to it the first place, for nowhere shall we find more able and more impartial criticism, and nowhere such a repertory of able original articles. Indeed, now that the "British and Foreign Medico-Chirurgical Review" has terminated its career, the American Journal stands without a rival.—*London Med. Times and Gazette*, Nov. 24, 1877.

> The best medical journal on the continent.—*Boston Med. and Surg. Journal*, April 17, 1879.

> The present number of the American Journal is an exceedingly good one, and gives every promise of maintaining the well-earned reputation of the review. Our venerable contemporary has our best wishes, and we can only express the hope that it may continue its work with as much vigor and excellence for the next fifty years as it has exhibited in the past.—*London Lancet*, Nov. 24, 1877.

> The Philadelphia Medical and Physical Journal issued its first number in 1820, and, after a brilliant career, was succeeded in 1827 by the American Journal of the Medical Sciences, a periodical of world-wide reputation; the ablest and one of the oldest periodicals in the world—a journal which has an unsullied record.—*Gross's History of American Med. Literature*, 1876.

> It is universally acknowledged to be the leading American medical journal, and, in our opinion, is second to none in the language.—*Boston Med. and Surg. Journal*, Oct. 1877.

> This is the medical journal of our country to which the American physician abroad will point with the greatest satisfaction, as reflecting the state of medical culture in his country. For a great many years it has been the medium through which our ablest writers have made known their discoveries and observations.—*Address of L. P. Yandell, M.D., before International Med. Congress*, Sept. 1876.

And that it was specifically included in the award of a medal of merit to the Publisher in the Vienna Exhibition in 1873.

The subscription price of the "American Journal of the Medical Sciences" has never been raised during its long career. It is still Five Dollars per annum; and when paid for in advance, the subscriber receives in addition the "Medical News and Abstract," making in all nearly 2000 large octavo pages per annum, free of postage.

II.

THE MEDICAL NEWS AND ABSTRACT.

Thirty-seven years ago the "Medical News" was commenced as a monthly to convey to the subscribers of the "American Journal" the clinical instruction and current information which could not be accommodated in the Quarterly. It consisted of sixteen pages of such matter, together with sixteen more known as the Library Department and devoted to the publishing of books. With the increased progress of science, however, this was found insufficient, and some years since another periodical, known as the "MONTHLY ABSTRACT," was started, and was furnished at a moderate price to subscribers to the "AMERICAN JOURNAL." These two monthlies will hereafter be consolidated, under the title of "THE MEDICAL NEWS AND ABSTRACT," and will be furnished *free of charge* in connection with the "AMERICAN JOURNAL."

---

* Communications are invited from gentlemen in all parts of the country. Elaborate articles inserted by the Editor are paid for by the Publisher.

The "NEWS AND ABSTRACT" will consist of 64 pages monthly, in a neat cover. It will contain a CLINICAL DEPARTMENT in which will be continued the series of ORIGINAL AMERICAN CLINICAL LECTURES, by gentlemen of the highest reputation throughout the United States, together with a choice selection of foreign Lectures and Hospital Notes and Gleanings. Then will follow the MONTHLY ABSTRACT, systematically arranged and classified, and presenting five or six hundred articles yearly; and each number will conclude with a NEWS DEPARTMENT, giving current professional intelligence, domestic and foreign, the whole fully indexed at the close of each volume, rendering it of permanent value for reference.

As stated above, the subscription price to the "NEWS AND ABSTRACT" will be Two Dollars and a Half per annum, invariably in advance, at which rate it will rank as one of the cheapest medical periodicals in the country. But it will also be furnished, free of all charge, in commutation with the "AMERICAN JOURNAL OF THE MEDICAL SCIENCES," to all who remit FIVE DOLLARS in advance, thus giving to the subscriber, for that very moderate sum, a complete record of medical progress throughout the world, in the compass of about two thousand large octavo pages.

In this effort to furnish so large an amount of practical information at a price so unprecedentedly low, and thus place it within the reach of every member of the profession, the publisher confidently anticipates the friendly aid of all who feel an interest in the dissemination of sound medical literature. He trusts, especially, that the subscribers to the "AMERICAN MEDICAL JOURNAL" will call the attention of their acquaintances to the advantages thus offered, and that he will be sustained in the endeavor to permanently establish medical periodical literature on a footing of cheapness never heretofore attempted.

PREMIUM FOR OBTAINING NEW SUBSCRIBERS TO THE "JOURNAL."

Any gentleman who will remit the amount for two subscriptions for 1880, one of which at least must be for a *new subscriber*, will receive as a PREMIUM, free by mail, a copy of any one of the following recent works:

"BARNES'S MANUAL OF MIDWIFERY" (see p. 24).
"TILBURY FOX'S EPITOME OF DISEASES OF THE SKIN," new edition, just ready, (see p. 17).
"FOTHERGILL'S ANTAGONISM OF MEDICINES" (see p. 16).
"HOLDEN'S LANDMARKS, MEDICAL AND SURGICAL" (see p. 6),
"BROWNE ON THE USE OF THE OPHTHALMOSCOPE" (see p. 29),
"FLINT'S ESSAYS ON CONSERVATIVE MEDICINE" (see p. 15),
"STURGES'S CLINICAL MEDICINE" (see p. 14),
"SWAYNE'S OBSTETRIC APHORISMS," new edition (see p. 21),
"TANNER'S CLINICAL MANUAL" (see p. 5).
"WEST ON NERVOUS DISORDERS OF CHILDREN" (see p. 20).

⁂ Gentlemen desiring to avail themselves of the advantages thus offered will do well to forward their subscriptions at an early day, in order to insure the receipt of complete sets for the year 1880.

☞ The safest mode of remittance is by bank check or postal money order, drawn to the order of the undersigned. Where these are not accessible, remittances for the "JOURNAL" may be made at the risk of the publisher, by forwarding in REGISTERED letters. Address,

HENRY C. LEA, Nos. 706 and 708 SANSOM ST., PHILADELPHIA, PA.

DUNGLISON (ROBLEY), M.D.,

Late Professor of Institutes of Medicine in Jefferson Medical College, Philadelphia.

MEDICAL LEXICON; A DICTIONARY OF MEDICAL SCIENCE: Containing a concise explanation of the various Subjects and Terms of Anatomy, Physiology, Pathology, Hygiene, Therapeutics, Pharmacology, Pharmacy, Surgery, Obstetrics, Medical Jurisprudence, and Dentistry. Notices of Climate and of Mineral Waters; Formulæ for Officinal, Empirical, and Dietetic Preparations; with the Accentuation and Etymology of the Terms, and the French and other Synonymes; so as to constitute a French as well as English Medical Lexicon. A New Edition. Thoroughly Revised, and very greatly Modified and Augmented. By RICHARD J. DUNGLISON, M.D. In one very large and handsome royal octavo volume of over 1100 pages. Cloth, $6 50; leather, raised bands, $7 50. (*Just Issued.*)

The object of the author from the outset has not been to make the work a mere lexicon or dictionary of terms, but to afford, under each, a condensed view of its various medical relations, and thus to render the work an epitome of the existing condition of medical science. Starting with this view, the immense demand which has existed for the work has enabled him, in repeated revisions, to augment its completeness and usefulness, until at length it has attained the position of a recognized and standard authority wherever the language is spoken.

Special pains have been taken in the preparation of the present edition to maintain this enviable reputation. During the ten years which have elapsed since the last revision, the additions to the nomenclature of the medical sciences have been greater than perhaps in any similar period of the past, and up to the time of his death the author labored assiduously to incorporate everything requiring the attention of the student or practitioner. Since then, the editor has been equally industrious, so that the additions to the vocabulary are more numerous than in any previous revision. Especial attention has been bestowed on the accentuation, which will be found marked on every word. The typographical arrangement has been much improved, rendering reference much more easy, and every care has been taken with the mechanical execution. The work has been printed on new type, small but exceedingly clear, with an enlarged page, so that the additions have been incorporated with an increase of but little over a hundred pages, and the volume now contains the matter of at least four ordinary octavos.

A book well known to our readers, and of which every American ought to be proud. When the learned author of the work passed away, probably all of us feared lest the book should not maintain its place in the advancing science whose terms it defines. Fortunately, Dr. Richard J. Dunglison, having assisted his father in the revision of several editions of the work, and having been, therefore, trained in the methods and imbued with the spirit of the book, has been able to edit it, not in the patchwork manner so dear to the heart of book editors, so repulsive to the taste of intelligent book readers, but to edit it as a work of the kind should be edited—to carry it on steadily, without jar or interruption, along the grooves of thought it has travelled during its lifetime. To show the magnitude of the task which Dr. Dunglison has assumed and carried through, it is only necessary to state that more than six thousand new subjects have been added in the present edition.—*Phila. Med. Times*, Jan. 3, 1874.

About the first book purchased by the medical student is the Medical Dictionary. The lexicon explanatory of technical terms is simply a *sine qua non*. In a science so extensive, and with such collaterals as medicine, it is as much a necessity also to the practising physician. To meet the wants of students and most physicians, the dictionary must be condensed while comprehensive, and practical while perspicacious. It was because Dunglison's met these indications that it became at once the dictionary of general use wherever medicine was studied in the English language. In no former revision have the alterations and additions been so great. More than six thousand new subjects and terms have been added. The chief terms have been set in black letter, while the derivatives follow in small caps; an arrangement which greatly facilitates reference. We may safely confirm the hope ventured by the editor "that the work, which possesses for him a filial as well as an individual interest, will be found worthy a continuance of the position so long accorded to it as a standard authority."—*Cincinnati Clinic*, Jan. 10, 1874.

It has the rare merit that it certainly has no rival in the English language for accuracy and extent of references.—*London Medical Gazette*

As a standard work of reference, as one of the best, if not the very best, medical dictionary in the English language, Dunglison's work has been well known for about forty years, and needs no words of praise on our part to recommend it to the members of the medical, and, likewise, of the pharmaceutical profession. The latter especially are in need of such a work, which gives ready and reliable information on thousands of subjects and terms which they are liable to encounter in pursuing their daily avocations, but with which they cannot be expected to be familiar. The work before us fully supplies this want.—*Am. Journ. of Pharm.*, Feb. 1874.

A valuable dictionary of the terms employed in medicine and the allied sciences, and of the relations of the subjects treated under each head. It reflects great credit on its able American author, and well deserves the authority and popularity it has obtained.—*British Med. Journ.*, Oct. 31, 1874.

Few works of this class exhibit a grander monument of patient research and of scientific lore. The extent of the sale of this lexicon is sufficient to testify to its usefulness, and to the great service conferred by Dr. Robley Dunglison on the profession, and indeed on others, by its issue.—*London Lancet*, May 13, 1875.

HOBLYN (RICHARD D.), M.D.

A DICTIONARY OF THE TERMS USED IN MEDICINE AND THE COLLATERAL SCIENCES. Revised, with numerous additions, by ISAAC HAYS, M.D., Editor of the "American Journal of the Medical Sciences." In one large royal 12mo. volume of over 500 double-columned pages; cloth, $1 50; leather, $2 00

It is the best book of definitions we have, and ought always to be upon the student's table.—*Southern Med. and Surg. Journal.*

RODWELL (G. F.), F.R.A.S., &c.

A DICTIONARY OF SCIENCE: Comprising Astronomy, Chemistry, Dynamics, Electricity, Heat, Hydrodynamics, Hydrostatics, Light, Magnetism, Mechanics, Meteorology, Pneumatics, Sound, and Statics. Preceded by an Essay on the History of the Physical Sciences. In one handsome octavo volume of 694 pages, and many illustrations; cloth, $5.

A *CENTURY OF AMERICAN MEDICINE.* 1776–1876. By Doctors E. H. Clarke, H. J. Bigelow, S. D. Gross, T. G. Thomas, and J. S. Billings. In one very handsome 12mo. volume of about 350 pages: cloth, $2 25. (*Just Ready.*)

This work appeared in the pages of the American Journal of the Medical Sciences during the year 1876. As a detailed account of the development of medical science in America, by gentlemen of the highest authority in their respective departments, the profession will no doubt welcome it in a form adapted for preservation and reference.

NEILL (JOHN), M.D., and SMITH (FRANCIS G.), M.D.,
Prof. of the Institutes of Medicine in the Univ. of Penna.

AN ANALYTICAL COMPENDIUM OF THE VARIOUS BRANCHES OF MEDICAL SCIENCE; for the Use and Examination of Students. A new edition, revised and improved. In one very large and handsomely printed royal 12mo. volume, of about one thousand pages, with 374 wood-cuts, cloth, $4; strongly bound in leather, with raised bands, $4 75.

HARTSHORNE (HENRY), M.D.,
Professor of Hygiene in the University of Pennsylvania.

A CONSPECTUS OF THE MEDICAL SCIENCES; containing Handbooks on Anatomy, Physiology, Chemistry, Materia Medica, Practical Medicine, Surgery, and Obstetrics. Second Edition, thoroughly revised and improved. In one large royal 12mo. volume of more than 1000 closely printed pages, with 477 illustrations on wood. Cloth, $4 25; leather, $5 00. (*Lately Issued.*)

We can say with the strictest truth that it is the best work of the kind with which we are acquainted. It embodies in a condensed form all recent contributions to practical medicine, and is therefore useful to every busy practitioner throughout our country, besides being admirably adapted to the use of students of medicine. The book is faithfully and ably executed.—*Charleston Med. Journ.*, April, 1875

The work is intended as an aid to the medical student, and as such appears to admirably fulfil its object by its excellent arrangement, the full compilation of facts, the perspicuity and terseness of language, and the clear and instructive illustrations in some parts of the work.—*American Journ. of Pharmacy*, Philadelphia, July, 1874.

The volume will be found useful, not only to students, but to many others who may desire to refresh their memories with the smallest possible expenditure of time.—*N. Y. Med. Journal*, Sept. 1874.

The student will find this the most convenient and useful book of the kind on which he can lay his hand.—*Pacific Med. and Surg. Journ.*, Aug. 1874.

This is the best book of its kind that we have ever examined. It is an honest, accurate, and concise compend of medical sciences, as fairly as possible representing their present condition. The changes and the additions have been so judicious and thorough as to render it, so far as it goes, entirely trustworthy. If students must have a conspectus, they will be wise to procure that of Dr. Hartshorne.—*Detroit Rev. of Med. and Pharm.*, Aug. 1874.

The work before us, however, has many redeeming features not possessed by others, and is the best we have seen. Dr. Hartshorne exhibits much skill in condensation. It is well adapted to the physician in active practice, who can give but limited time to the familiarizing of himself with the important changes which have been made since he attended lectures. The manual of physiology has also been improved and gives the most comprehensive view of the latest advances in the science possible in the space devoted to the subject. The mechanical execution of the book leaves nothing to be wished for.—*Peninsular Journal of Medicine*, Sept. 1874.

After carefully looking through this conspectus, we are constrained to say that it is the most complete work, especially in its illustrations, of its kind that we have seen.—*Cincinnati Lancet*, Sept. 1874.

The favor with which the first edition of this Compendium was received, was an evidence of its various excellences. The present edition bears evidence of a careful and thorough revision. Dr. Hartshorne possesses a happy faculty of seizing upon the salient points of each subject, and of presenting them in a concise and yet perspicuous manner.—*Leavenworth Med. Herald*, Oct. 1874.

LUDLOW (J. L.), M.D.

A MANUAL OF EXAMINATIONS upon Anatomy, Physiology, Surgery, Practice of Medicine, Obstetrics, Materia Medica, Chemistry, Pharmacy, and Therapeutics. To which is added a Medical Formulary. Third edition, thoroughly revised and greatly extended and enlarged. With 370 illustrations. In one handsome royal 12mo. volume of 816 large pages, cloth, $3 25; leather, $3 75.

The arrangement of this volume in the form of question and answer renders it especially suitable for the office examination of students, and for those preparing for graduation.

TANNER (THOMAS HAWKES), M.D., &c.

A MANUAL OF CLINICAL MEDICINE AND PHYSICAL DIAGNOSIS. Third American from the Second London Edition. Revised and Enlarged by TILBURY FOX, M. D., Physician to the Skin Department in University College Hospital, &c. In one neat volume small 12mo., of about 375 pages, cloth, $1 50.

⁂ On page 4, it will be seen that this work is offered as a premium for procuring new subscribers to the "AMERICAN JOURNAL OF THE MEDICAL SCIENCES."

GRAY (HENRY), F.R.S.,

Lecturer on Anatomy at St. George's Hospital, London.

ANATOMY, DESCRIPTIVE AND SURGICAL. The Drawings by H. V. CARTER, M.D., and Dr. WESTMACOTT. The Dissections jointly by the AUTHOR and Dr. CARTER. With an Introduction on General Anatomy and Development by T. HOLMES, M.A., Surgeon to St. George's Hospital. A new American, from the eighth enlarged and improved London edition. To which is added "LANDMARKS, MEDICAL AND SURGICAL," by LUTHER HOLDEN, F.R.C.S., author of "Human Osteology," "A Manual of Dissections," etc. In one magnificent imperial octavo volume of 983 pages, with 522 large and elaborate engravings on wood. Cloth, $6; leather, raised bands, $7. (*Just Ready.*)

The author has endeavored in this work to cover a more extended range of subjects than is customary in the ordinary text-books, by giving not only the details necessary for the student, but also the application of those details in the practice of medicine and surgery, thus rendering it both a guide for the learner, and an admirable work of reference for the active practitioner. The engravings form a special feature in the work, many of them being the size of nature, nearly all original, and having the names of the various parts printed on the body of the cut, in place of figures of reference, with descriptions at the foot. They thus form a complete and splendid series, which will greatly assist the student in obtaining a clear idea of Anatomy, and will also serve to refresh the memory of those who may find in the exigencies of practice the necessity of recalling the details of the dissecting room; while combining, as it does, a complete Atlas of Anatomy, with a thorough treatise on systematic, descriptive, and applied Anatomy, the work will be found of essential use to all physicians who receive students in their offices, relieving both preceptor and pupil of much labor in laying the groundwork of a thorough medical education.

Since the appearance of the last American Edition, the work has received three revisions at the hands of its accomplished editor, Mr. Holmes, who has sedulously introduced whatever has seemed requisite to maintain its reputation as a complete and authoritative standard text-book and work of reference. Still further to increase its usefulness, there has been appended to it the recent work by the distinguished anatomist, Mr. Luther Holden—"Landmarks, Medical and Surgical"—which gives in a clear, condensed, and systematic way, all the information by which the practitioner can determine from the external surface of the body the position of internal parts. Thus complete, the work, it is believed, will furnish all the assistance that can be rendered by type and illustration in anatomical study. No pains have been spared in the typographical execution of the volume, which will be found in all respects superior to former issues. Notwithstanding the increase of size, amounting to over 100 pages and 57 illustrations, it will be kept, as heretofore, at a price rendering it one of the cheapest works ever offered to the American profession.

The recent work of Mr. Holden, which was noticed by us on p. 53 of this volume, has been added as an appendix, so that, altogether, this is the most practical and complete anatomical treatise available to American students and physicians. The former finds in it the necessary guide in making dissections; a very comprehensive chapter on minute anatomy; and about all that can be taught him on general and special anatomy; while the latter, in its treatment of each region from a surgical point of view, and in the valuable edition of Mr. Holden, will find all that will be essential to him in his practice.—*New Remedies*, Aug. 1878.

This work is as near perfection as one could possibly or reasonably expect any book intended as a text-book or a general reference book on anatomy to be. The American publisher deserves the thanks of the profession for appending the recent work of Mr. Holden, "*Landmarks, Medical and Surgical*," which has already been commended as a separate book. The latter work—treating of topographical anatomy—has become an essential to the library of every intelligent practitioner. We know of no book that can take its place, written as it is by a most distinguished anatomist. It would be simply a waste of words to say anything further in praise of Gray's Anatomy, the text-book in almost every medical college in this country, and the daily reference book of every practitioner who has occasion to consult his books on anatomy. The work is simply indispensable, especially this present American edition.—*Va. Med. Monthly*, Sept. 1878.

The addition of the recent work of Mr. Holden, as an appendix, renders this the most practical and complete treatise available to American students, who find in it a comprehensive chapter on minute anatomy, about all that can be taught on general and special anatomy, while its treatment of each region, from a surgical point of view, in the valuable section by Mr. Holden, is all that will be essential to them in practice.—*Ohio Medical Recorder*, Aug. 1878.

It is difficult to speak in moderate terms of this new edition of "Gray." It seems to be as nearly perfect as it is possible to make a book devoted to any branch of medical science. The labors of the eminent men who have successively revised the eight editions through which it has passed, would seem to leave nothing for future editors to do. The addition of Holden's "Landmarks" will make it as indispensable to the practitioner of medicine and surgery as it has been heretofore to the student. As regards completeness, ease of reference, utility, beauty, and cheapness, it has no rival. No student should enter a medical school without it; no physician can afford to have it absent from his library.—*St. Louis Clin. Record*, Sept. 1878.

ALSO FOR SALE SEPARATE—

HOLDEN (LUTHER), F.R.C.S.,

Surgeon to St. Bartholomew's and the Foundling Hospitals.

LANDMARKS, MEDICAL AND SURGICAL. From the 2d London Ed. In one handsome volume, royal 12mo., of 128 pages: cloth, 88 cents. (*Now Ready.*)

HEATH (CHRISTOPHER), F.R.C.S.,

Teacher of Operative Surgery in University College, London.

PRACTICAL ANATOMY: A Manual of Dissections. From the Second revised and improved London edition. Edited, with additions, by W. W. KEEN, M. D., Lecturer on Pathological Anatomy in the Jefferson Medical College, Philadelphia. In one handsome royal 12mo. volume of 578 pages, with 247 illustrations. Cloth, $3 50; leather, $4 00.

ALLEN (HARRISON), M.D.

Professor of Physiology in the Univ. of Pa.

A SYSTEM OF HUMAN ANATOMY: INCLUDING ITS MEDICAL and Surgical Relations. For the Use of Practitioners and Students of Medicine. With an Introductory Chapter on Histology. By E. O. SHAKESPEARE, M. D., Ophthalmologist to the Phila. Hosp. In one large and handsome quarto volume, with several hundred original illustrations on lithographic plates, and numerous wood-cuts in the text. (*Preparing.*)

In this elaborate work, which has been in active preparation for several years, the author has sought to give, not only the details of descriptive anatomy in a clear and condensed form, but also the practical applications of the science to medicine and surgery. The work thus has claims upon the attention of the general practitioner, as well as of the student, enabling him not only to refresh his recollections of the dissecting room, but also to recognize the significance of all variations from normal conditions. The marked utility of the object thus sought by the author is self evident, and his long experience and assiduous devotion to its thorough development are a sufficient guarantee of the manner in which his aims have been carried out. No pains have been spared with the illustrations. Those of normal anatomy are from original dissections, drawn on stone by Mr. Hermann Faber, with the name of every part clearly engraved upon the figure, after the manner of "Holden" and "Gray," and in every typographical detail it will be the effort of the publisher to render the volume worthy of the very distinguished position which is anticipated for it.

ELLIS (GEORGE VINER).

Emeritus Professor of Anatomy in University College, London.

DEMONSTRATIONS OF ANATOMY; Being a Guide to the Knowledge of the Human Body by Dissection. By GEORGE VINER ELLIS, Emeritus Professor of Anatomy in University College, London. From the Eighth and Revised London Edition. In one very handsome octavo volume of over 700 pages, with 256 illustrations. Cloth, $4.25; leather, $5.25. (*Just Ready.*)

This work has long been known in England as the leading authority on practical anatomy, and the favorite guide in the dissecting-room, as is attested by the numerous editions through which it has passed. In the last revision, which has just appeared in London, the accomplished author has sought to bring it on a level with the most recent advances of science by making the necessary changes in his account of the microscopic structure of the different organs, as developed by the latest researches in textural anatomy.

Ellis's Demonstrations is the favorite text-book of the English student of anatomy. In passing through eight editions it has been so revised and adapted to the needs of the student that it would seem that it had almost reached perfection in this special line. The descriptions are clear, and the methods of pursuing anatomical investigations are given with such detail that the book is honestly entitled to its name.—*St. Louis Clinical Record*, June, 1879.

The success of this old manual seems to be as well deserved in the present as in the past volumes. The book seems destined to maintain yet for years its leadership over the English manuals upon dissecting.—*Phila. Med. Times*, May 24, 1879.

As a dissector, or a work to have in hand and studied while one is engaged in dissecting, we regard it as the very best work extant, which is certainly saying a very great deal. As a text-book to be studied in the dissecting-room, it is superior to any of the works upon anatomy.—*Cincinnati Med. News*, May 24, 1879.

We most unreservedly recommend it to every practitioner of medicine who can possibly get it.—*Va. Med. Monthly*, June, 1579.

WILSON (ERASMUS), F.R.S.

A SYSTEM OF HUMAN ANATOMY, General and Special. Edited by W. H. GOBRECHT, M.D., Professor of General and Surgical Anatomy in the Medical College of Ohio. Illustrated with three hundred and ninety-seven engravings on wood. In one large and handsome octavo volume, of over 600 large pages; cloth, $4; leather, $5.

SMITH (HENRY H.), M.D., and HORNER (WILLIAM E.), M.D.,

Prof. of Surgery in the Univ. of Penna., &c. *Late Prof. of Anatomy in the Univ. of Penna.*

AN ANATOMICAL ATLAS; illustrative of the Structure of the Human Body. In one volume, large imperial octavo, cloth, with about six hundred and fifty beautiful figures. $4 50.

SCHAFER (EDWARD ALBERT), M.D.,

Assistant Professor of Physiology in University College, London.

A COURSE OF PRACTICAL HISTOLOGY: Being an Introduction to the Use of the Microscope. In one handsome royal 12mo. volume of 304 pages, with numerous illustrations: cloth, $2 00. (*Just Issued.*)

HORNER'S SPECIAL ANATOMY AND HISTOLOGY. Eighth edition, extensively revised and modified. In 2 vols. 8vo., of over 1000 pages, with 320 wood-cuts: cloth, $6 00.

SHARPEY AND QUAIN'S HUMAN ANATOMY. Revised, by JOSEPH LEIDY, M. D., Prof. of Anat. in Univ. of Penn. In two octavo vols. of about 1300 pages, with 511 illustrations. Cloth, $6 00.

BELLAMY'S STUDENT'S GUIDE TO SURGICAL ANATOMY: A Text-book for Students preparing for their Pass Examination. With engravings on wood. In one handsome royal 12mo. volume. Cloth, $2 25.

CLELAND'S DIRECTORY FOR THE DISSECTION OF THE HUMAN BODY. In one small volume royal 12mo. of 182 pages: cloth $1 25.

CARPENTER (WILLIAM B.), M. D., F. R. S., F.G.S., F.L.S.,

Registrar to University of London, etc.

PRINCIPLES OF HUMAN PHYSIOLOGY; Edited by HENRY POWER, M.B. Lond., F.R.C.S., Examiner in Natural Sciences, University of Oxford. A new American from the Eighth Revised and Enlarged English Edition, with Notes and Additions, by FRANCIS G. SMITH, M.D., Professor of the Institutes of Medicine in the University of Pennsylvania, etc. In one very large and handsome octavo volume, of 1083 pages, with two plates and 373 engravings on wood; cloth, $5 50; leather, $6 50. (*Just Issued.*)

The great work, the crowning labor of the distinguished author, and through which so many generations of students have acquired their knowledge of Physiology, has been almost metamorphosed in the effort to adapt it thoroughly to the requirements of modern science. Since the appearance of the last American edition, it has had several revisions at the experienced hand of Mr. Power, who has modified and enlarged it so as to introduce all that is important in the investigations and discoveries of England, France, and Germany, resulting in an enlargement of about one-fourth in the text. The series of illustrations has undergone a like revision, a large proportion of the former ones having been rejected, and the total number increased to nearly four hundred. The thorough revision which the work has so recently received in England, has rendered unnecessary any elaborate additions in this country, but the American Editor, Professor Smith, has introduced such matters as his long experience has shown him to be requisite for the student. Every care has been taken with the typographical execution, and the work is presented, with its thousand closely, but clearly printed pages, as emphatically the text-book for the student and practitioner of medicine—the one in which, as heretofore, especial care is directed to show the applications of physiology in the various practical branches of medical science. Notwithstanding its very great enlargement, the price has not been increased, rendering this one of the cheapest works now before the profession.

We have been agreeably surprised to find the volume so complete in regard to the structure and functions of the nervous system in all its relations, a subject that, in many respects, is one of the most difficult of all, in the whole range of physiology, upon which to produce a full and satisfactory treatise of the class to which the one before us belongs. The additions by the American editor give to the work as it is a considerable value beyond that of the last English edition. In conclusion, we can give our cordial recommendation to the work as it now appears. The editors have, with their additions to the only work on physiology in our language that, in the fullest sense of the word, is the production of a philosopher as well as a physiologist, brought it up as fully as could be expected, if not desired, to the standard of our knowledge of its subject at the present day. It will deservedly maintain the place it has always had in the favor of the medical profession.—*Journ. of Nervous and Mental Disease*, April, 1877.

"Good wine needs no bush" says the proverb, and an old and faithful servant like the "big" Carpenter, as carefully brought down as this edition has been by Mr. Henry Power, needs little or no commendation by us. Such enormous advances have recently been made in our physiological knowledge, that what was perfectly new a year or two ago, looks now as if it had been a received and established fact for years. In this encyclopædic way it is unrivalled. Here, as it seems to us, is the great value of the book; one is safe in sending a student to it for information on almost any given subject, perfectly certain of the fulness of information it will convey, and well satisfied of the accuracy with which it will there be found stated.—*London Med. Times and Gazette*, Feb. 17, 1877.

Thus fully are treated the structure and functions of all the important organs of the body, while there are chapters on sleep and somnambulism; chapters on ethnology; a full section on generation, and abundant references to the curiosities of physiology, as the evolution of light, heat, electricity, etc. In short, this new edition of Carpenter is, as we have said at the start, a very encyclopedia of modern physiology.—*The Clinic*, Feb. 24, 1877.

The merits of "Carpenter's Physiology" are so widely known and appreciated that we need only allude briefly to the fact that in the latest edition will be found a comprehensive embodiment of the results of recent physiological investigation. Care has been taken to preserve the practical character of the original work. In fact the entire work has been brought up to date, and bears evidence of the amount of labor that has been bestowed upon it by its distinguished editor, Mr. Henry Power. The American editor has made the latest additions, in order fully to cover the time that has elapsed since the last English edition.—*N. Y. Med. Journal*, Jan. 1877.

A more thorough work on physiology could not be found. In this all the facts discovered by the late researches are noticed, and neither student nor practitioner should be without this exhaustive treatise on an important elementary branch of medicine.—*Atlanta Med. and Surg. Journal*, Dec. 1876.

KIRKES (WILLIAM SENHOUSE), M.D.

A MANUAL OF PHYSIOLOGY. Edited by W. MORRANT BAKER, M.D., F.R.C.S. A new American from the eighth and improved London edition. With about two hundred and fifty illustrations. In one large and handsome royal 12mo. volume. Cloth, $3 25; leather, $3 75. (*Lately Issued.*)

On the whole, there is very little in the book which either the student or practitioner will not find of practical value and consistent with our present knowledge of this rapidly changing science; and we have no hesitation in expressing our opinion that this eighth edition is one of the best handbooks on physiology which we have in our language.—*N. Y. Med. Record*, April 15, 1873.

In its enlarged form it is, in our opinion, still the best book on physiology, most useful to the student.—*Phila. Med. Times*, Aug. 30, 1873.

HARTSHORNE'S HANDBOOK OF ANATOMY AND PHYSIOLOGY. Second edition, revised. In one royal 12mo. vol., with 220 wood-cuts; cloth, $1 75.

LEHMANN'S MANUAL OF CHEMICAL PHYSIOLOGY. Translated from the German, with Notes and Additions, by J. CHESTON MORRIS, M.D. With illustrations on wood. In one octavo volume of 336 pages. Cloth, $2 25.

LEHMANN'S PHYSIOLOGICAL CHEMISTRY. Complete in two large octavo volumes of 1200 pages, with 200 illustrations; cloth, $6.

DALTON (J. C.), M.D.,
Professor of Physiology in the College of Physicians and Surgeons, New York, &c.

A TREATISE ON HUMAN PHYSIOLOGY. Designed for the use of Students and Practitioners of Medicine. Sixth edition, thoroughly revised and enlarged, with three hundred and sixteen illustrations on wood. In one very beautiful octavo volume, of over 800 pages. Cloth, $5 50; leather, $6 50. (*Just Issued.*)

During the past few years several new works on physiology, and new editions of old works, have appeared, competing for the favor of the medical student, but none will rival this new edition of Dalton. As now enlarged, it will be found also to be, in general, a satisfactory work of reference for the practitioner.—*Chicago Med. Journ. and Examiner*, Jan. 1876.

Prof. Dalton has discussed conflicting theories and conclusions regarding physiological questions with a fairness, a fulness, and a conciseness which lend freshness and vigor to the entire book. But his discussions have been so guarded by a refusal of admission to those speculative and theoretical explanations, which at best exist in the minds of observers themselves as only probabilities, that none of his readers need be led into grave errors while making them a study.—*The Medical Record*, Feb. 19, 1876.

The revision of this great work has brought it forward with the physiological advances of the day, and renders it, as it has ever been, the finest work for students extant.—*Nashville Journ. of Med. and Surg.*, Jan. 1876.

For clearness and perspicuity, Dalton's Physiology commended itself to the student years ago, and was a pleasant relief from the verbose productions which it supplanted. Physiology has, however, made many advances since then—and while the style has been preserved intact, the work in the present edition has been brought up fully abreast of the times. The new chemical notation and nomenclature have also been introduced into the present edition. Notwithstanding the multiplicity of text-books on physiology, this will lose none of its old time popularity. The mechanical execution of the work is all that could be desired.—*Peninsular Journal of Medicine*, Dec. 1875.

This popular text-book on physiology comes to us in its sixth edition with the addition of about fifty per cent. of new matter, chiefly in the departments of pathological chemistry and the nervous system, where the principal advances have been realized. With so thorough revision and additions, that keep the work well up to the times, its continued popularity may be confidently predicted, notwithstanding the competition it may encounter. The publisher's work is admirably done.—*St. Louis Med. and Surg. Journ.*, Dec. 1875.

We heartily welcome this, the sixth edition of this admirable text-book, than which there are none of equal brevity more valuable. It is cordially recommended by the Professor of Physiology in the University of Louisiana, as by all competent teachers in the United States, and wherever the English language is read, this book has been appreciated. The present edition, with its 316 admirably executed illustrations, has been carefully revised and very much enlarged, although its bulk does not seem perceptibly increased.—*New Orleans Medical and Surgical Journal*, March, 1876.

The present edition is very much superior to every other, not only in that it brings the subject up to the times, but that it does so more fully and satisfactorily than any previous edition. Take it altogether it remains in our humble opinion, the best text-book on physiology in any land or language.—*The Clinic*, Nov. 6, 1875.

As a whole, we cordially recommend the work as a text-book for the student, and as one of the best.—*The Journal of Nervous and Mental Disease*, Jan. 1876.

Still holds its position as a masterpiece of lucid writing, and is, we believe, on the whole, the best book to place in the hands of the student.—*London Students' Journal.*

CLASSEN (ALEXANDER),
Professor in the Royal Polytechnic School, Aix la-Chapelle.

ELEMENTARY QUANTITATIVE ANALYSIS. Translated with notes and additions by EDGAR F. SMITH, Ph.D., Assistant Prof. of Chemistry in the Towne Scientific School, Univ. of Penna. In one handsome royal 12mo. volume, of 324 pages, with illustrations; cloth, $2 00. (*Just Ready.*)

It is probably the best manual of an elementary nature extant, insomuch as its methods are the best. It teaches by examples, commencing with single determinations, followed by separations, and then advancing to the analysis of minerals and such products as are met with in applied chemistry. It is an indispensable book for students in chemistry.—*Boston Journ. of Chemistry*, Oct. 1878.

GALLOWAY (ROBERT), F.C.S.,
Prof of Applied Chemistry in the Royal College of Science for Ireland, etc.

A MANUAL OF QUALITATIVE ANALYSIS. From the Fifth London Edition. In one neat royal 12mo. volume, with illustrations; cloth, $2 75. (*Lately Issued.*)

BOWMAN (JOHN E.), M.D.

INTRODUCTION TO PRACTICAL CHEMISTRY, INCLUDING ANALYSIS. Sixth American, from the sixth and revised London edition. With numerous illustrations. In one neat vol., royal 12mo., cloth, $2 25.

BY THE SAME AUTHOR.

PRACTICAL HANDBOOK OF MEDICAL CHEMISTRY. New edition. In one neat volume, royal 12mo. (*Preparing.*)

REMSEN (IRA), M.D., Ph.D.,
Professor of Chemistry in the Johns Hopkins University, Baltimore.

PRINCIPLES OF THEORETICAL CHEMISTRY, with special reference to the Constitution of Chemical Compounds. In one handsome royal 12mo. vol. of over 232 pages: cloth, $1 50. (*Just Issued.*)

WOHLER AND FITTIG.

OUTLINES OF ORGANIC CHEMISTRY. Translated with Additions from the Eighth German Ed. By IRA REMSEN, M.D., Ph.D., Prof. of Chem and Physics in Williams College, Mass. In one volume, royal 12mo. of 550 pp., cloth, $3

FOWNES (GEORGE), Ph.D.

A MANUAL OF ELEMENTARY CHEMISTRY; Theoretical and Practical.

Revised and corrected by HENRY WATTS, B.A., F R.S., author of "A Dictionary of Chemistry," etc. With a colored plate, and one hundred and seventy-seven illustrations. A new American, from the twelfth and enlarged London edition. Edited by ROBERT BRIDGES, M.D. In one large royal 12mo. volume, of over 1000 pages; cloth, $2 75; leather, $3 25. (*Just Ready.*)

Two careful revisions by Mr. Watts, since the appearance of the last American edition of "Fownes," have so enlarged the work that in England it has been divided into two volumes In reprinting it, by the use of a small and exceedingly clear type, cast for the purpose, it has been found possible to comprise the whole, without omission, in one volume, not unhandy for study and reference. The enlargement of the work has induced the American Editor to confine his additions to the narrowest compass, and he has accordingly inserted only such discoveries as have been announced since the very recent appearance of the work in England, and has added the standards in popular use to the Decimal and Centigrade systems employed in the original.

Among the additions to this edition will be found a very handsome colored plate, representing a number of spectra in the spectroscope. Every care has been taken in the typographical execution to render the volume worthy in every respect of its high reputation and extended use, and though it has been enlarged by more than one hundred and fifty pages, its very moderate price will still maintain it as one of the cheapest volumes accessible to the chemical student.

This work, inorganic and organic, is complete in one convenient volume. In its earliest editions it was fully up to the latest advancements and theories of that time. In its present form, it presents, in a remarkably convenient and satisfactory manner, the principles and leading facts of the chemistry of *to-day.* Concerning the manner in which the various subjects are treated, much deserves to be said, and mostly, too, in praise of the book. A review of such a work as *Fownes's Chemistry* within the limits of a book-notice for a medical weekly is simply out of the question.—*Cincinnati Lancet and Clinic*, Dec. 14, 1878.

When we state that, in our opinion, the present edition sustains in every respect the high reputation which its predecessors have acquired and enjoyed, we express therewith our full belief in its intrinsic value as a text-book and work of reference.—*Am. Journ. of Pharm.*, Aug. 1878.

The conscientious care which has been bestowed upon it by the American and English editors renders it still, perhaps, the best book for the student and the practitioner who would keep alive the acquisitions of his student days. It has, indeed, reached a somewhat formidable magnitude with its more than a thousand pages, but with less than this no fair representation of chemistry as it now is can be given. The type is small but very clear, and the sections are very lucidly arranged to facilitate study and reference.—*Med and Surg. Reporter*, Aug 3, 1878.

The work is too well known to American students to need any extended notice; suffice it to say that the revision by the English editor has been faithfully done, and that Professor Bridges has added some fresh and valuable matter, especially in the inorganic chemistry. The book has always been a favorite in this country, and in its new shape bids fair to retain all its former *prestige.*—*Boston Jour. of Chemistry*, Aug. 1878.

It will be entirely unnecessary for us to make any remarks relating to the general character of Fownes' Manual. For over twenty years it has held *the* foremost place as a text-book, and the elaborate and thorough revisions which have been made from time to time leave little chance for any wide awake rival to step before it.—*Canadian Pharm. Jour.*, Aug. 1878.

As a manual of chemistry it is without a superior in the language.—*Md. Med. Jour.*, Aug. 1878.

ATTFIELD (JOHN), Ph.D.,

Professor of Practical Chemistry to the Pharmaceutical Society of Great Britain, &c.

CHEMISTRY, GENERAL, MEDICAL, AND PHARMACEUTICAL;

including the Chemistry of the U. S. Pharmacopœia. A Manual of the General Principles of the Science, and their Application to Medicine and Pharmacy. Eighth edition revised by the author. In one handsome royal 12mo. volume of 700 pages, with illustrations. Cloth, $2 50; leather, $3 00. (*Just Ready.*)

We have repeatedly expressed our favorable opinion of this work, and on the appearance of a new edition of it, little remains for us to say, except that we expect this eighth edition to be as indispensable to us as the seventh and previous editions have been. While the general plan and arrangement have been adhered to, new matter has been added covering the observations made since the former edition The present differs from the preceding one chiefly in these alterations and in about ten pages of useful tables added in the appendix —*Am. Jour. of Pharmacy*, May, 1879.

A standard work like Attfield's Chemistry need only be mentioned by its name, without further comments The present edition contains such alterations and additions as seemed necessary for the demonstration of the latest developments of chemical principles, and the latest applications of chemistry to pharmacy. The author has bestowed arduous labor on the revision, and the extent of the information thus introduced may be estimated from the fact that the index contains three hundred new references relating to additional material.—*Druggists' Circular and Chemical Gazette*, May, 1879.

This very popular and meritorious work has now reached its eighth edition, which fact speaks in the highest terms in commendation of its excellence. It has now become the principal text-book of chemistry in all the medical colleges in the United States. The present edition contains such alterations and additions as seemed necessary for the demonstration of the latest developments of chemical principles, and the latest applications of chemistry to pharmacy It is scarcely necessary for us to say that it exhibits chemistry in its present advanced state.—*Cincinnati Medical News*, April, 1879.

The popularity which this work has enjoyed is owing to the original and clear disposition of the facts of the science, the accuracy of the details, and the omission of much which freights many treatises heavily without bringing corresponding instruction to the reader. Dr. Attfield writes for students, and primarily for medical students; he always has an eye to the pharmacopœia and its officinal preparations; and he is continually putting the matter in the text so that it responds to the questions with which each section is provided. Thus the student learns easily, and can always refresh and test his knowledge.—*Med and Surg. Reporter*, April 19, '79.

We noticed only about two years and a half ago the publication of the preceding edition, and remarked upon the exceptionally valuable character of the work. The work now includes the whole of the chemistry of the pharmacopœia of the United States, Great Britain, and India.—*New Remedies*, May, 1879.

BLOXAM (C. L.),

Professor of Chemistry in King's College, London.

CHEMISTRY, INORGANIC AND ORGANIC. From the Second London Edition. In one very handsome octavo volume, of 700 pages, with about 300 illustrations. Cloth, $4 00; leather, $5 00. (*Lately Issued.*)

We have in this work a complete and most excellent text-book for the use of schools, and can heartily recommend it as such.—*Boston Med. and Surg. Journ.*, May 28, 1874.

The above is the title of a work which we can most conscientiously recommend to students of chemistry. It is as easy as a work on chemistry could be made, at the same time that it presents a full account of that science as it now stands. We have spoken of the work as admirably adapted to the wants of students; it is quite as well suited to the requirements of practitioners who wish to review their chemistry, or have occasion to refresh their memories on any point relating to it. In a word, it is a book to be read by all who wish to know what is the chemistry of the present day.—*American Practitioner*, Nov. 1873.

It would be difficult for a practical chemist and teacher to find any material fault with this most admirable treatise. The author has given us almost a cyclopædia within the limits of a convenient volume, and has done so without penning the *useless* paragraphs too commonly making up a great part of the bulk of many cumbrous works. The progressive scientist is not disappointed when he looks for the record of new and valuable processes and discoveries, while the cautious conservative does not find its pages monopolized by uncertain theories and speculations. A peculiar point of excellence is the crystallized form of expression in which great truths are expressed in very short paragraphs. One is surprised at the brief space allotted to an important topic, and yet, after reading it, he feels that little, if any more should have been said. Altogether, it is seldom you see a text-book so nearly faultless. — *Cincinnati Lancet* Nov. 1873.

CLOWES (FRANK), D.Sc., London.

Senior Science-Master at the High School, Newcastle-under Lyme, etc.

AN ELEMENTARY TREATISE ON PRACTICAL CHEMISTRY AND QUALITATIVE INORGANIC ANALYSIS. Specially adapted for Use in the Laboratories of Schools and Colleges and by Beginners. From the Second and Revised English Edition, with about fifty illustrations on wood. In one very handsome royal 12mo. volume of 372 pages: cloth, $2 50. (*Now Ready.*)

It is short, concise, and eminently practical. We therefore heartily commend it to students, and especially to those who are obliged to dispense with a master. Of course, a teacher is in every way desirable, but a good degree of technical skill and practical knowledge can be attained with no other instructor than the very valuable handbook now under consideration.—*St Louis Clin. Record*, Oct. 1877.

The work is so written and arranged that it can be comprehended by the student without a teacher, and the descriptions and directions for the various work are so simple, and yet concise, as to be interesting and intelligible. The work is unincumbered with theoretical deductions, dealing wholly with the practical matter, which it is the aim of this comprehensive text-book to impart. The accuracy of the analytical methods are vouched for from the fact that they have all been worked through by the author and the members of his class, from the printed text. We can heartily recommend the work to the student of chemistry as being a reliable and comprehensive one.—*Druggists' Advertiser*, Oct. 15, 1877.

KNAPP'S TECHNOLOGY; or Chemistry Applied to the Arts, and to Manufactures. With American additions by Prof. WALTER R. JOHNSON. In two very handsome octavo volumes, with 500 wood engravings, cloth, $6 00.

PARRISH (EDWARD),

Late Professor of Materia Medica in the Philadelphia College of Pharmacy.

A TREATISE ON PHARMACY. Designed as a Text-Book for the Student, and as a Guide for the Physician and Pharmaceutist. With many Formulæ and Prescriptions. Fourth Edition, thoroughly revised, by THOMAS S. WIEGAND. In one handsome octavo volume of 977 pages, with 280 illustrations; cloth, $5 50; leather, $6 50. (*Lately Issued.*)

Of Dr. Parrish's great work on pharmacy it only remains to be said that the editor has accomplished his work so well as to maintain, in this fourth edition, the high standard of excellence which it had attained in previous editions, under the editorship of its accomplished author. This has not been accomplished without much labor, and many additions and improvements, involving changes in the arrangement of the several parts of the work, and the addition of much new matter. With the modifications thus effected it constitutes, as now presented, a compendium of the science and art indispensable to the pharmacist, and of the utmost value to every practitioner of medicine desirous of familiarizing himself with the pharmaceutical preparation of the articles which he prescribes for his patients.—*Chicago Med. Journ.*, July, 1874.

The work is eminently practical, and has the rare merit of being readable and interesting, while it preserves a strictly scientific character. The whole work reflects the greatest credit on author, editor and publisher. It will convey some idea of the liberality which has been bestowed upon its production when we mention that there are no less than 280 carefully executed illustrations. In conclusion, we heartily recommend the work, not only to pharmacists, but also to the multitude of medical practitioners who are obliged to compound their own medicines. It will ever hold an honored place on our own bookshelves.—*Dublin Med. Press and Circular*, Aug. 12, 1874.

We expressed our opinion of a former edition in terms of unqualified praise, and we are in no mood to detract from that opinion in reference to the present edition, the preparation of which has fallen into competent hands. It is a book with which no pharmacist can dispense, and from which no physician can fail to derive much information of value to him in practice.—*Pacific Med. and Surg. Journ.*, June, '74.

Perhaps one, if not the most important book upon pharmacy which has appeared in the English language has emanated from the transatlantic press. "Parrish's Pharmacy" is a well-known work on this side of the water, and the fact shows us that a really useful work never becomes merely local in its fame. Thanks to the judicious editing of Mr. Wiegand, the posthumous edition of "Parrish" has been saved to the public with all the mature experience of its author, and perhaps none the worse for a dash of new blood.—Lond. Pharm. Journal, Oct. 17, 1874.

FARQUHARSON (ROBERT), M.D.,

Lecturer on Materia Medica at St. Mary's Hospital Medical School.

A GUIDE TO THERAPEUTICS AND MATERIA MEDICA. Second American edition, revised by the Author. Enlarged and adapted to the U. S. Pharmacopœia. By Frank Woodbury, M.D. In one neat royal 12mo. volume of 498 pages: cloth, $2.25. (*Just Ready.*)

The appearance of a new edition of this convenient and handy book in less than two years may certainly be taken as an indication of its usefulness. Its convenient arrangement, and its terseness, and, at the same time, completeness of the information given, make it a handy book of reference.—*Am. Journ. of Pharmacy*, June, 1879.

The early appearance of a second edition of Dr. Farquharson's work bears sufficient testimony to the appreciation of it by American readers. The plan is such as to bring the character and action of drugs to the eye and mind with clearness The care with which both author and editor have done their work is conspicuous on every page.—*Med. and Surg. Reporter*, May 31, 1879.

The second edition, enlarged and revised, is a happy medium between the first edition, which was rather too brief on some important matters, and the large octavos of Wood and Bartholow. It is brought up to the most recent researches, one note referring to an article published in April of this year. The favorable reception accorded it, shown by this reissue in two years, was one well merited.—*Louisville Med. News*, June 7, 1879.

This work contains in moderate compass such well-digested facts concerning the physiological and therapeutical action of remedies as are reasonably established up to the present time. By a convenient arrangement the corresponding effects of each article in health and disease are presented in parallel columns, not only rendering reference easier, but also impressing the facts more strongly upon the mind of the reader. The book has been adapted to the wants of the American student, and copious notes have been introduced, embodying the latest revision of the Pharmacopœia, together with the antidotes to the more prominent poisons, and such of the newer remedial agents as seemed necessary to the completeness of the work. Tables of weights and measures, and a good alphabetical index, end the volume.—*Druggists' Circular and Chemical Gazette*, June, 1879.

It is a pleasure to think that the rapidity with which a second edition is demanded may be taken as an indication that the sense of appreciation of the value of reliable information regarding the use of remedies is not entirely overwhelmed in the cultivation of pathological studies, characteristic of the present day. This work certainly merits the success it has so quickly achieved.—*New Remedies*, July, '79.

STILLÉ (ALFRED), M.D.,

Professor of Theory and Practice of Medicine in the University of Penna.

THERAPEUTICS AND MATERIA MEDICA; a Systematic Treatise on the Action and Uses of Medicinal Agents, including their Description and History. Fourth edition, revised and enlarged. In two large and handsome 8vo. vols. of about 2000 pages. Cloth, $10; leather, $12. (*Lately Issued.*)

It is unnecessary to do much more than to announce the appearance of the fourth edition of this well known and excellent work.—*Brit. and For. Med.-Chir. Review*, Oct. 1875.

For all who desire a complete work on therapeutics and materia medica for reference, in cases involving medico-legal questions, as well as for information concerning remedial agents, Dr. Stillé's is "*par excellence*" the work. The work being out of print, by the exhaustion of former editions, the author has laid the profession under renewed obligations, by the careful revision, important additions, and timely reissuing a work not exactly supplemented by any other in the English language, if in any language. The mechanical execution handsomely sustains the well-known skill and good taste of the publisher.—*St. Louis Med. and Surg. Journal*, Dec. 1874.

From the publication of the first edition "Stillé's Therapeutics" has been one of the classics; its absence from our libraries would create a vacuum which could be filled by no other work in the language, and its presence supplies, in the two volumes of the present edition, a whole cyclopædia of therapeutics.—*Chicago Medical Journal*, Feb. 1875.

The rapid exhaustion of three editions and the universal favor with which the work has been received by the medical profession, are sufficient proof of its excellence as a repertory of practical and useful information for the physician. The edition before us fully sustains this verdict, as the work has been carefully revised and in some portions rewritten, bringing it up to the present time by the admission of chloral and croton-chloral, nitrite of amyl, bichloride of methylene, methylic ether, lithium compounds, gelseminum, and other remedies.—*Am. Journ. of Pharmacy*, Feb. 1875.

We can hardly admit that it has a rival in the multitude of its citations and the fulness of its research into clinical histories, and we must assign it a place in the physician's library; not, indeed, as fully representing the present state of knowledge in pharmacodynamics, but as by far the most complete treatise upon the clinical and practical side of the question.—*Boston Med. and. Surg. Journal*, Nov. 5, 1874.

GRIFFITH (ROBERT E.), M.D.

A UNIVERSAL FORMULARY, Containing the Methods of Preparing and Administering Officinal and other Medicines. The whole adapted to Physicians and Pharmaceutists. Third edition, thoroughly revised, with numerous additions, by John M. Maisch, Professor of Materia Medica in the Philadelphia College of Pharmacy. In one large and handsome octavo volume of about 800 pp., cl., $4 50; leather, $5 50. (*Lately Issued.*)

To the druggist a good formulary is simply indispensable, and perhaps no formulary has been more extensively used than the well-known work before us. Many physicians have to officiate, also, as druggists. This is true especially of the country physician, and a work which shall teach him the means by which to administer or combine his remedies in the most efficacious and pleasant manner, will always hold its place upon his shelf. A formulary of this kind is of benefit also to the city physician in largest practice.—*Cincinnati Clinic*, Feb. 21, 1874.

A more complete formulary than it is in its present form the pharmacist or physician could hardly desire. To the first some such work is indispensable, and it is hardly less essential to the practitioner who compounds his own medicines. Much of what is contained in the introduction ought to be committed to memory by every student of medicine. As a help to physicians it will be found invaluable, and doubtless will make its way into libraries not already supplied with a standard work of the kind.—The American *Practitioner*, Louisville, July, '74.

STILLÉ (ALFRED), M. D., LL.D., and MAISCH (JOHN M.), Ph.D.,
Prof. of Theory and Practice of Medicine and of Clinical Med. in Univ. of Pa. — *Prof. of Mat. Med. and Bot. in Phila. Coll. Pharmacy, Secy. to the American Pharmaceutical Association.*

THE NATIONAL DISPENSATORY: Containing the Natural History, Chemistry, Pharmacy, Actions and Uses of Medicines, including those recognized in the Pharmacopœias of the United States, Great Britain, and Germany, with numerous references to the French Codex. Second edition, thoroughly revised, with numerous additions. In one very handsome octavo volume of 1692 pages, with 239 illustrations. Extra cloth, $6 75; leather, raised bands, $7 50. (*Now Ready.*)

PREFACE TO THE SECOND EDITION.

The demand which has exhausted in a few months an unusually large edition of the National Dispensatory is doubly gratifying to the authors, as showing that they were correct in thinking that the want of such a work was felt by the medical and pharmaceutical professions, and that their efforts to supply that want have been acceptable. This appreciation of their labors has stimulated them in the revision to render the volume more worthy of the very marked favor with which it has been received. The first edition of a work of such magnitude must necessarily be more or less imperfect; and though but little that is new and important has been brought to light in the short interval since its publication, yet the length of time during which it was passing through the press rendered the earlier portions more in arrears than the later. The opportunity for a revision has enabled the authors to scrutinize the work as a whole, and to introduce alterations and additions wherever there has seemed to be occasion for improvement or greater completeness. The principal changes to be noted are the introduction of several drugs under separate headings, and of a large number of drugs, chemicals, and pharmaceutical preparations classified as allied drugs and preparations under the heading of more important or better known articles: these additions comprise in part nearly the entire German Pharmacopœia and numerous articles from the French Codex. All new investigations which came to the authors' notice up to the time of publication have received due consideration.

The series of illustrations has undergone a corresponding thorough revision. A number have been added, and still more have been substituted for such as were deemed less satisfactory.

The new matter embraced in the text is equal to nearly one hundred pages of the first edition. Considerable as are these changes as a whole, they have been accommodated by an enlargement of the page without increasing unduly the size of the volume.

While numerous additions have been made to the sections which relate to the physiological action of medicines and their use in the treatment of disease, great care has been taken to make them as concise as was possible without rendering them incomplete or obscure. The doses have been expressed in the terms both of troy weight and of the metrical system, for the purpose of making those who employ the Dispensatory familiar with the latter, and paving the way for its introduction into general use.

The Therapeutical Index has been extended by about 2250 new references, making the total number in the present edition about 6000.

The articles there enumerated as remedies for particular diseases are not only those which, in the authors' opinion, are curative, or even beneficial, but those also which have at any time been employed on the ground of popular belief or professional authority. It is often of as much consequence to be acquainted with the worthlessness of certain medicines or with the narrow limits of their power, as to know the well attested virtues of others and the conditions under which they are displayed. An additional value possessed by such an Index is, that it contains the elements of a natural classification of medicines, founded upon an analysis of the results of experience, which is the only safe guide in the treatment of disease.

A few notices of the previous edition are appended.

To the profession at large, then, we will appeal when we say that the Messrs. Churchills have done a public service in introducing this book to English readers. As far as we can see on that perusal which can alone be given to books which are only intended to be books of reference, we should say that this is probably the most perfect book of its kind now available. It is emphatically, we would repeat, a book for the practitioner, one well calculated to give him hints as to treatment, and most suggestive as to remedies. It would be difficult for us to say more.—*London Med. Times and Gazette*, July 12, 1879.

We intend to draw the attention of our brother pharmacists to this publication, which cannot fail to exercise a widespread and marked influence upon the discharge of the duties of their vocation. The material embodied in the work is truly immense, as shown alone by the almost countless number of subjects treated. We congratulate the authors upon their success in having brought to a close a work which must inevitably take its place as one of the most important contributions to medical and pharmaceutical literature.—*Am. Journ. of Pharm.*, May, 1879.

The association of such distinguished authors as Professors Stillé and Maisch in the composition of a work of this character has excited the strongest interest and the highest expectations in the mind of every physician and pharmacist in the country. *For once we can truly say that the promise of excellence has been fulfilled to the letter*, and the National Dispensatory has come almost perfect from the hands of its makers. The entire work is a most excellent one, and cannot fail to satisfy the purchaser. We can conscientiously recommend it to every student and practitioner of medicine and pharmacy.—*St. Louis Clinical Record*, Apr. 1879.

This magnificent work has at last arrived, and we are at a loss for words to express our appreciation and to give our readers an idea of it. The subject-matter is brought to date, showing that it has been the unceasing aim of the authors to supply a much needed book, one that will contain all the important facts, and not dwell upon points that are of comparatively little interest to any but a specially interested student. While this work, on account of its conciseness, is adapted to the pharmacal student, it is equally adapted to the medical student and practitioner by its well arranged therapeutical index containing about 3750 references, while the materia medica index embraces about 10,400. The physician sees at a glance all medicines that are used for any certain class of disease.—*Chicago Pharmacist and Chemist*, April, 1879.

It has been prepared by two gentlemen whose learning fully qualified them for the difficult task, and whose eminence entitles them to be heard with the respect and attention due to authority. The "raison d'être" of the book is modestly stated in the preface, and now that it has been published and opens to us its vast stores of information, we may add that it was almost a necessity.—*N. C. Medical Journ.*, March, 1879.

CORNIL (V.), *AND* *RANVIER (L.),*
Prof. in the Faculty of Med., Paris. *Prof. in the College of France.*

MANUAL OF PATHOLOGICAL HISTOLOGY.

Translated, with Notes and Additions, by E. O. SHAKESPEARE, M.D., Pathologist and Ophthalmic Surgeon to Philada. Hospital, Lecturer on Refraction and Operative Ophthalmic Surgery in Univ. of Penna., and by HENRY C. SIMES, M.D., Demonstrator of Pathological Histology in the Univ. of Pa. In one very handsome octavo volume of about 700 pages, with over 300 illustrations. (*Shortly.*)

So much has been done of late years in the elucidation of pathology by means of the microscope, and this subject now occupies so prominent a position as one of the most important branches of medical science, that the American profession cannot fail to welcome a translation of the present work, which, through its own merits and through the well-known reputation of its distinguished authors, is regarded in Europe as the standard text-book and work of reference in its department. Such investigations and discoveries as have been made since its appearance will be introduced by the translator, and the work is confidently expected to assume in this country the same position which has been so universally accorded to it abroad.

FENWICK (SAMUEL), M.D.,
Assistant Physician to the London Hospital.

THE STUDENT'S GUIDE TO MEDICAL DIAGNOSIS.

From the Third Revised and Enlarged English Edition. With eighty-four illustrations on wood. In one very handsome volume, royal 12mo., cloth, $2 25. (*Just Issued.*)

Of the many guide-books on medical diagnosis, claimed to be written for the special instruction of students, this is the best. The author is evidently a well-read and accomplished physician, and he knows how to teach practical medicine. The charm of simplicity is not the least interesting feature in the manner in which Dr. Fenwick conveys instruction. There are few books of this size on practical medicine that contain so much and convey it so well as the volume before us. It is a book we can sincerely recommend to the student for direct instruction, and to the practitioner as a ready and useful aid to his memory.—*Am. Journ. of Syphilography*, Jan. 1874.

GREEN (T. HENRY), M.D.,
Lecturer on Pathology and Morbid Anatomy at Charing-Cross Hospital Medical School, etc.

PATHOLOGY AND MORBID ANATOMY.

Third American, from the Fourth and Enlarged and Revised English Edition. In one very handsome octavo volume of 332 pages, with 132 illustrations; cloth, $2 25. (*Just Ready.*)

This is unquestionably one of the best manuals on the subject of pathology and morbid anatomy that can be placed in the student's hands, and we are glad to see it kept up to the times by new editions. Each edition is carefully revised by the author, with the view of making it include the most recent advances in pathology, and of omitting whatever may have become obsolete.—*N. Y. Med. Jour.*, Feb. 1879.

The treatise of Dr. Green is compact, clearly expressed, up to the times, and popular as a text-book, both in England and America. The cuts are sufficiently numerous, and usually well made. In the present edition, such new matter has been added as was necessary to embrace the later results in pathological research. No doubt it will continue to enjoy the favor it has received at the hands of the profession.—*Med and Surg. Reporter*, Feb. 1, 1879.

For practical, ordinary daily use, this is undoubtedly the best treatise that is offered to students of pathology and morbid anatomy.—*Cincinnati Lancet and Clinic*, Feb. 8, 1879.

DAVIS (NATHAN S.),
Prof. of Principles and Practice of Medicine, etc., in Chicago Med. College.

CLINICAL LECTURES ON VARIOUS IMPORTANT DISEASES;

being a collection of the Clinical Lectures delivered in the Medical Wards of Mercy Hospital, Chicago. Edited by FRANK H. DAVIS, M.D. Second edition, enlarged. In one handsome royal 12mo. volume. Cloth, $1 75. (*Lately Issued.*)

CHRISTISON'S DISPENSATORY. With copious additions, and 213 large wood engravings. By R. EGLESFIELD GRIFFITH, M.D. One vol. 8vo., pp. 1000, cloth. $4 00.

CARPENTER'S PRIZE ESSAY ON THE USE OF ALCOHOLIC LIQUORS IN HEALTH AND DISEASE. New edition, with a Preface by D. F. CONDIE, M.D., and explanations of scientific words. In one neat 12mo. volume, pp. 178, cloth. 60 cents.

GLUGE'S ATLAS OF PATHOLOGICAL HISTOLOGY. Translated, with Notes and Additions, by JOSEPH LEIDY, M.D. In one volume, very large imperial quarto, with 320 copper-plate figures, plain and colored, cloth. $4 00.

LA ROCHE ON YELLOW FEVER, considered in its Historical, Pathological, Etiological, and Therapeutical Relations. In two large and handsome octavo volumes of nearly 1500 pp., cloth. $7 00.

HOLLAND'S MEDICAL NOTES AND REFLECTIONS. 1 vol. 8vo., pp. 500, cloth. $3 50.

BARLOW'S MANUAL OF THE PRACTICE OF MEDICINE. With Additions by D. F. CONDIE, M.D. 1 vol. 8vo., pp. 600, cloth. $2 50.

TODD'S CLINICAL LECTURES ON CERTAIN ACUTE DISEASES. In one neat octavo volume, of 320 pp., cloth. $2 50.

STURGES'S INTRODUCTION TO THE STUDY OF CLINICAL MEDICINE. Being a Guide to the Investigation of Disease. In one handsome 12mo. volume, cloth, $1 25. (*Lately Issued.*)

STOKES' LECTURES ON FEVER. Edited by JOHN WILLIAM MOORE, M.D., Assistant Physician to the Cork Street Fever Hospital. In one neat 8vo. volume, cloth, $2 00. (*Just Issued.*)

THE CYCLOPÆDIA OF PRACTICAL MEDICINE: comprising Treatises on the Nature and Treatment of Diseases, Materia Medica and Therapeutics, Diseases of Women and Children, Medical Jurisprudence, etc. etc. By DUNGLISON, FORBES, TWEEDIE, and CONOLLY. In four large super-royal octavo volumes, of 3254 double-columned pages, strongly and handsomely bound in leather, $15; cloth, $11-

FLINT (AUSTIN), M.D.,

Professor of the Principles and Practice of Medicine in Bellevue Med. College, N. Y.

A TREATISE ON THE PRINCIPLES AND PRACTICE OF MEDICINE; designed for the use of Students and Practitioners of Medicine. Fourth edition, revised and enlarged. In one large and closely printed octavo volume of about 1100 pp.; cloth, $6 00; or strongly bound in leather, with raised bands, $7 00. (*Lately Issued.*)

By common consent of the English and American medical press, this work has been assigned to the highest position as a complete and compendious text-book on the most advanced condition of medical science. At the very moderate price at which it is offered it will be found one of the cheapest volumes now before the profession.

This excellent treatise on medicine has acquired for itself in the United States a reputation similar to that enjoyed in England by the admirable lectures of Sir Thomas Watson. We have referred to many of the most important chapters, and find the revision spoken of in the preface is a genuine one, and that the author has very fairly brought up his matter to the level of the knowledge of the present day. The work has this great recommendation, that it is in one volume, and therefore will not be so terrifying to the student as the bulky volumes which several of our English text-books of medicine have developed into. —*British and Foreign Med.-Chir. Rev.*, Jan. 1875.

It is of course unnecessary to introduce or eulogize this now standard treatise. The present edition has been enlarged and revised to bring it up to the author's present level of experience and reading. His own clinical studies and the latest contributions to medical literature both in this country and in Europe, have received careful attention, so that some portions have been entirely rewritten, and about seventy pages of new matter have been added.—*Chicago Med. Jour.*, June, 1873.

Has never been surpassed as a text-book for students and a book of ready reference for practitioners. The force of its logic, its simple and practical teachings, have left it without a rival in the field. *N. Y.—Med. Record*, Sept. 15, 1874.

It is given to very few men to tread in the steps of Austin Flint, whose single volume on medicine, though here and there defective, is a masterpiece of lucid condensation and of general grasp of an enormously wide subject.—*Lond. Practitioner*, Dec.'73.

BY THE SAME AUTHOR.

CLINICAL MEDICINE; a Systematic Treatise on the Diagnosis and Treatment of Diseases. Designed for Students and Practitioners of Medicine. In one large and handsome octavo volume of 795 pages; cloth, $4 50. (*Now Ready.*)

It has been the object of the author in this volume to present the science and art of medicine in their most practical aspect, adapted to the necessities of the student and physician in the daily routine of duties at the bedside. By avoiding the discussion of questions relating to pathology and etiology, space is gained for the thorough consideration of diagnosis and treatment, embracing many points which escape attention in the ordinary text-books. In the arrangement of the work, diseases are classed according to the system of organs primarily affected; and affections closely related are grouped together so as to elucidate their differentiation, and the appropriate treatment is pointed out for each. The preparation of the work has occupied the author for several years, and is presented as embodying the results of prolonged observation and experience under opportunities more extensive than often fall to the lot of the physician.

BY THE SAME AUTHOR

ESSAYS ON CONSERVATIVE MEDICINE AND KINDRED TOPICS. In one very handsome royal 12mo. volume. Cloth, $1 38. (*Just Issued.*)

HARTSHORNE (HENRY), M.D.,

Professor of Hygiene in the University of Pennsylvania

ESSENTIALS OF THE PRINCIPLES AND PRACTICE OF MEDICINE. A handy-book for Students and Practitioners. Fourth edition, revised and improved. With about one hundred illustrations. In one handsome royal 12mo. volume, of about 550 pages, cloth, $2 63; half bound, $2 88. (*Lately Issued.*)

As a handbook, which clearly sets forth the ESSENTIALS of the PRINCIPLES AND PRACTICE OF MEDICINE, we do not know of its equal.—*Va. Med. Monthly.*

As a brief, condensed, but comprehensive handbook, it cannot be improved upon.—*Chicago Med. Examiner*, Nov. 15, 1874.

Without doubt the best book of the kind published in the English language.—*St. Louis Med. and Surg. Journ.*, Nov. 1874.

WATSON (THOMAS), M.D., &c.

LECTURES ON THE PRINCIPLES AND PRACTICE OF PHYSIC. Delivered at King's College, London. A new American, from the Fifth revised and enlarged English edition. Edited, with additions, and several hundred illustrations, by HENRY HARTSHORNE, M.D., Professor of Hygiene in the University of Pennsylvania. In two large and handsome 8vo. vols. Cloth, $9 00; leather, $11 00. (*Lately Published.*)

It is a subject for congratulation and for thankfulness that Sir Thomas Watson, during a period of comparative leisure, after a long, laborious, and most honorable professional career, while retaining full possession of his high mental faculties, should have employed the opportunity to submit his Lectures to a more thorough revision than was possible during the earlier and busier period of his life. Carefully passing in review some of the most intricate and important pathological and practical questions, the results of his clear insight and his calm judgment are now recorded for the benefit of mankind, in language which, for precision, vigor, and classical elegance, has rarely been equalled, and never surpassed. The revision has evidently been most carefully done, and the results appear in almost every page.—*Brit. Med. Journ.*, Oct. 14, 1871.

BRISTOWE (JOHN SYER), M.D., F.R.C.P.,

Physician and Joint Lecturer on Medicine, St. Thomas's Hospital.

A MANUAL ON THE PRACTICE OF MEDICINE. Edited, with Additions, by JAMES H. HUTCHINSON, M.D., Physician to the Penna. Hospital. In one handsome octavo volume of over 1100 pages: cloth, $5 50; leather, $6 50. (*Just Issued.*)

This portly volume is a model of condensation. In a style at once clear, interesting, and concise, Dr. Bristowe passes in review every conceivable subject connected with the practice of medicine. Those practitioners who purchase few books will find this a most opportune publication, because so many topics not usually embraced in a work on practice are adequately handled. The book is a thoroughly good one, and its usefulness to American readers has been increased by the judicious notes of the Editor.—*Cincinnati Clinic*, Jan 7, 1877.

Any one who wants a good, clear, condensed work upon Practice, quite up with the most recent views in pathology, will find this a most valuable work. The additions made by Dr. Hutchinson are appropriate and useful, and so well done that we wish there were more of them.—*Am. Practitioner*, Feb. 1877.

WOODBURY (FRANK), M.D.,

Physician to the German Hospital, Philadelphia, late Chief Assist. to Med. Clinic, Jeff. College Hospital, etc.

A HANDBOOK OF THE PRINCIPLES AND PRACTICE OF Medicine; for the use of Students and Practitioners. Based upon Husband's Handbook of Practice. In one neat volume, royal 12mo. (*In Press.*)

HABERSHON (S. O.), M.D.

Senior Physician to and late Lecturer on the Principles and Practice of Medicine at Guy's Hospital, etc.

ON THE DISEASES OF THE ABDOMEN, COMPRISING THOSE of the Stomach, and other parts of the Alimentary Canal, Œsophagus, Cæcum, Intestines, and Peritoneum. Second American, from the third enlarged and revised English edition. With illustrations. In one handsome octavo volume of over 500 pages. Cloth, $3 50. (*Now Ready.*)

This work has remained some time out of print, owing to the careful and conscientious revision which it has enjoyed at the hands of the author, and which has nearly doubled its size since the appearance of the first edition. Yet there is no work accessible to the profession to take its place, as a careful, practical guide on a class of diseases, which form so large and important a portion of the duties of the physician, and for which the author's position has given him almost unequalled opportunities for observation and experience.

We can do very little to add to the favorable reception which has already been given by the medical press of the world to this well known treatise. We commend to all practitioners a careful perusal of Dr. Habershon's work. More especially, we draw attention to the number of intestinal diseases recorded in its pages, cases of extreme interest clinically and pathologically. This careful record shows that the work is no compilation, but a careful exposition of the author's personal experience.—*Canadian Med. and Surg. Journ.*, May, 1879.

As a work of reference, as well as daily study, no work yet emanating from the medical press is worthy of more careful consideration by the general practitioner than the above. With the careful revision given this edition, Dr. Habershon's work will still remain at the head of the list, and continue to be regarded as one of the best treatises on abdominal diseases extant.—*South. Practitioner*. June, 1879.

There have been many laborers in this department of special pathology, and among them no one has done better service than Dr. Habershon. The first editions were exhausted long since, and the author has revised the one now under consideration with great care and thoroughness. The chapters on constipation and intestinal obstruction are of high value, and are worth many times the cost of the book, which, altogether, is a most excellent one.—*St. Louis Clin. Record*, June, 1879.

This valuable treatise on diseases of the stomach and abdomen has been out of print for several years, and is therefore not so well known to the profession as it deserves to be. It will be found a cyclopædia of information, systematically arranged, on all diseases of the alimentary tract, from the mouth to the rectum. A fair proportion of each chapter is devoted to symptoms, pathology, and therapeutics. The present edition is fuller than former ones in many particulars, and has been thoroughly revised and amended by the author. Several new chapters have been added, bringing the work fully up to the times, and making it a volume of interest to the practitioner in every field of medicine and surgery. Perverted nutrition is in some form associated with all diseases we have to combat, and we need all the light that can be obtained on a subject so broad and general. Dr Habershon's work is one that every practitioner should read and study for himself.—*N. Y. Med. Journ.*, April, 1879.

FOTHERGILL (J. MILNER), M.D. Edin., M.R.C.P. Lond.,

Asst. Phys. to the West Lond. Hosp.; Asst. Phys. to the City of Lond. Hosp., etc.

THE PRACTITIONER'S HANDBOOK OF TREATMENT; Or, the Principles of Therapeutics. In one very neat octavo volume of about 550 pages: cloth, $4 00. (*Now Ready.*)

Our friends will find this a very readable book; and that it sheds light upon every theme it touches, causing the practitioner to feel more certain of his diagnosis in difficult cases. We confidently commend the work to our readers as one worthy of careful perusal. It lights the way over obscure and difficult passes in medical practice. The chapter on the circulation of the blood is the most exhaustive and instructive to be found. It is a book every practitioner needs, and would have, if he knew how suggestive and helpful it would be to him.—*St. Louis Med. and Surg. Journ.*, April, 1877.

We heartily commend his book to the medical student as an honest and intelligent guide through the mazes of therapeutics, and assure the practitioner who has grown gray in the harness that he will derive pleasure and instruction from its perusal. Valuable suggestions and material for thought abound throughout.—*Boston Med. and Surg. Journal*, Mar. 8, 1877.

BY THE SAME AUTHOR.

THE ANTAGONISM OF THERAPEUTIC AGENTS, AND WHAT IT TEACHES. Being the Fothergillian Prize Essay for 1878. In one neat volume, royal 12mo. of 156 pages; cloth, $1 00. (Just Ready.)

REYNOLDS (J. RUSSELL), M.D.,

Prof. of the Principles and Practice of Medicine in Univ. College, London.

A SYSTEM OF MEDICINE WITH NOTES AND ADDITIONS BY HENRY HARTSHORNE, M.D., late Professor of Hygiene in the University of Penna. In three large and handsome octavo volumes, containing about 3000 closely printed double-columned pages, with numerous illustrations. (*In Press*.)

VOLUME I. (*nearly ready*) contains GENERAL DISEASES and DISEASES OF THE NERVOUS SYSTEM.

VOLUME II. (*shortly*) will contain DISEASES OF THE RESPIRATORY and CIRCULATORY SYSTEMS.

VOLUME III. (*preparing for early publication*) will contain DISEASES OF THE DIGESTIVE and BLOOD GLANDULAR SYSTEMS, OF THE URINARY ORGANS, OF THE FEMALE REPRODUCTIVE SYSTEM, and OF THE CUTANEOUS SYSTEM.

Reynolds's SYSTEM OF MEDICINE, recently completed, has acquired, since the first appearance of the first volume, the well deserved reputation of being the work in which modern British medicine is presented in its fullest and most practical form. This could scarce be otherwise in view of the fact that it is the result of the collaboration of the leading minds of the profession, each subject being treated by some gentleman who is regarded as its highest authority—as for instance, Diseases of the Bladder by Sir HENRY THOMPSON, Malpositions of the Uterus by GRAILY HEWITT, Insanity by HENRY MAUDSLEY, Consumption by J. HUGHES BENNET, Diseases of the Spine by CHARLES BLAND RADCLIFFE, Pericarditis by FRANCIS SIBSON, Alcoholism by FRANCIS E. ANSTIE, Renal Affections by WILLIAM ROBERTS, Asthma by HYDE SALTER, Cerebral Affections by H. CHARLTON BASTIAN, Gout and Rheumatism by ALFRED BARING GARROD, Constitutional Syphilis by JONATHAN HUTCHINSON, Diseases of the Stomach by WILSON FOX, Diseases of the Skin by BALMANNO SQUIRE, Affections of the Larynx by MORELL MACKENZIE, Diseases of the Rectum by BLIZARD CURLING, Diabetes by LAUDER BRUNTON, Intestinal Diseases by JOHN SYER BRISTOWE, Catalepsy and Somnambulism by THOMAS KING CHAMBERS, Apoplexy by J. HUGHLINGS JACKSON, Angina Pectoris by Professor GAIRDNER, Emphysema of the Lungs by Sir WILLIAM JENNER, etc. etc. All the leading schools in Great Britain have contributed their best men in generous rivalry, to build up this monument of medical science. St. Bartholomew's, Guy's, St. Thomas's, University College, St. Mary's in London, while the Edinburgh, Glasgow, and Manchester schools are equally well represented, the Army Medical School at Netley, the military and naval services, and the public health boards. That a work conceived in such a spirit, and carried out under such auspices should prove an indispensable treasury of facts and experience, suited to the daily wants of the practitioner, was inevitable, and the success which it has enjoyed in England, and the reputation which it has acquired on this side of the Atlantic, have sealed it with the approbation of the two pre-eminently practical nations.

Its large size and high price having kept it beyond the reach of many practitioners in this country who desire to possess it, a demand has arisen for an edition at a price which shall render it accessible to all. To meet this demand the present edition has been undertaken. The five volumes and five thousand pages of the original will, by the use of a smaller type and double columns, be compressed into three volumes of about three thousand pages, clearly and handsomely printed, and offered at a price which will render it one of the cheapest works ever presented to the American profession.

But not only will the American edition be more convenient and lower priced than the English; it will also be better and more complete. Some years having elapsed since the appearance of a portion of the work, additions will be required to bring up the subjects to the existing condition of science. Some diseases, also, which are comparatively unimportant in England, require more elaborate treatment to adapt the articles devoted to them to the wants of the American physician; and there are points on which the received practice in this country differs from that adopted abroad. The supplying of these deficiencies has been undertaken by HENRY HARTSHORNE, M.D., late Professor of Hygiene in the University of Pennsylvania, who will endeavor to render the work fully up to the day, and as useful to the American physician as it has proved to be to his English brethren. The number of illustrations will also be largely increased, and no effort will be spared to render the typographical execution unexceptionable in every respect. The first volume containing more than 1100 pages, is now on the eve of publication. Volume II. is far advanced in preparation, and the completion of the whole may be expected before the close of the year.

FOX (TILBURY), M.D., F.R.C.P., and T. C. FOX, B.A., M.R.C.S.,

Physician to the Department for Skin Diseases, University College Hospital.

EPITOME OF SKIN DISEASES. WITH FORMULÆ. FOR STUDENTS AND PRACTITIONERS. Second edition, thoroughly revised and greatly enlarged. In one very handsome 12mo. volume of 216 pages. Cloth, $1 38. (*Just Ready.*)

The names of the authors are quite sufficient to commend this book, Dr. Tilbury Fox being well known as occupying a place in the front rank of dermatologists of the day.—*Canadian Journal of Med. Sci.*, May, 1878.

The present edition of the Epitome considerably exceeds in size, and surpasses in use, its predecessor. The work is certainly a valuable addition to the "handy volume" department of medical literature.—*The Med. Bulletin*, May, 1878.

For students a better book was never devised.—*Cincinnati Lancet and Clinic*, May, 1879.

WILSON'S STUDENT'S BOOK OF CUTANEOUS MEDICINE and DISEASES OF THE SKIN. In one very handsome royal 12mo volume. $3 50.

HILLIER'S HANDBOOK OF SKIN DISEASES, for Students and Practitioners. Second Am Ed In one royal 12mo. vol of 358 pp. With illustrations. Cloth, $2 25.

FINLAYSON (JAMES), M.D.,

Physician and Lecturer on Clinical Medicine in the Glasgow Western Infirmary, etc.

CLINICAL DIAGNOSIS; A Handbook for Students and Practitioners of Medicine. In one handsome 12mo. volume, of 546 pages, with 85 illustrations. Cloth, $2 63. (*Just Ready.*)

The book is an excellent one, clear, concise, convenient, practical. It is replete with the very knowledge the student needs when he quits the lecture-room and the laboratory for the ward and sick-room, and does not lack in information that will meet the wants of experienced and older men.—*Phila. Med. Times*, Jan. 4, 1879.

The aim of the author is to teach a student and practitioner how to examine a case so as to use "*all his knowledge*" in arriving at a diagnosis. All the various symptoms of the several systems are grouped together in such a manner as to make their relations to a final diagnosis clear and easy of apprehension. This work has been done by men of large experience and trained observation, who have been long recognized as authorities upon the subjects which they treat. There is a profusion of illustrations to illustrate subjects under discussion. The application of electricity, and instruments of precision in diagnosis, is fully discussed. This book is all good. We commend it to all students and practitioners of medicine as a work worthy of a place in their libraries.—*Ohio Med. Recorder*, Dec. 1878.

This is one of the really useful books. It is attractive from preface to the final page, and ought to be given a place on every office table, because it contains in a condensed form all that is valuable in semeiology and diagnostics to be found in bulkier volumes, and because in its arrangement and complete index, it is unusually convenient for quick reference in any emergency that may come upon the busy practitioner. —*N. C. Med. Journ.*, Jan. 1879.

This is a most important work for students, and one that is destined to become rapidly popular. It is composed of contributions from various eminent sources bearing upon this subject. The real secret of successful practice is the accurate diagnosis of disease. This manual teaches the student to arrange his investigation in such system as to enable him, with practice, to acquire this very desirable faculty. The division of the subject, as in this work, among the highest authorities living, is a good idea, and gives us in one compact form a series of monographs written by masters.—*Nashville Journal of Med. and Surg.*, Jan. 1879.

HAMILTON (ALLAN McLANE), M.D.,

Attending Physician at the Hospital for Epileptics and Paralytics, Blackwell's Island, N.Y., and at the Out-Patients' Department of the New York Hospital.

NERVOUS DISEASES; THEIR DESCRIPTION AND TREATMENT. In one handsome octavo volume of 512 pages, with 53 illus.; cloth, $3 50. (*Just Ready.*)

This is unquestionably the best and most complete text-book of nervous diseases that has yet appeared, and were international jealousy in scientific affairs at all possible, we might be excused for a feeling of chagrin that it should be of American parentage. This work, however, has been performed in New York, and has been so well performed that no room is left for anything but commendation. With great skill, Dr. Hamilton has presented to his readers a succinct and lucid survey of all that is known of the pathology of the nervous system, viewed in the light of the most recent researches. From the preliminary description of the methods of examination and study, and of the instruments of precision employed in the investigation of nervous diseases, up till the final collection of formulæ, the book is eminently practical.—*Brain*, London, Oct. 1878.

The author tells us in his preface that it has been his object to produce a concise, practical book, and we think he has been successful, considering the extent of the subject which he has undertaken. In fact, it is more extensive than the title properly or accurately indicates, embracing—besides what are usually regarded as nervous diseases—inflammatory affections, both acute and chronic, hemorrhages and tumors of the cerebrum and cerebellum, medulla oblongata, spinal cord and nerves, with thrombosis and embolism of the arteries, sinuses, and veins. The reader may therefore expect information, more or less full and satisfactory, on almost every point connected with the nervous system. We have no hesitation in saying that reliance may be placed on Dr. Hamilton's conscientious performance of his self-assigned task, on his soundness of judgment, and freedom from empiricism.—*Edinburgh Med. Journ.*, Oct. 1878.

From a very careful examination of the whole work, we can justly say that the author has not only clearly and fully treated of diagnosis and treatment, but, unlike most works of this class, it is very comprehensive in regard to etiology, and exposes the pathology of nervous diseases in the light of the very latest experiments and discoveries. The drawings are excellent and well selected. After this careful revision, we can heartily recommend this work to students and general practitioners in particular as being a full exposition of diseases of the nervous system, their pathology and treatment, to date.—*N. Y. Med. Record*, Aug. 3, 1878.

As stated in the preface, the author's object has been to write a concise and practical book, for which there is certainly a place, and we think he has succeeded admirably in fulfilling his object. The usual plan is adopted in the classification of the different diseases, the book not being greatly unlike Hammond's in this respect, although it is very noticeable throughout that the author's opinions vary widely from those of Dr Hammond.—*Am. Supp. Obstet. Journ. Great Britain and Ireland*, July, 1878.

CHARCOT (J. M.),

Professor to the Faculty of Med. Paris, Phys. to La Salpêtrière, etc.

LECTURES ON DISEASES OF THE NERVOUS SYSTEM. Translated from the Second Edition by GEORGE SIGERSON, M.D., M.Ch., Lecturer on Biology, etc., Cath. Univ. of Ireland. With illustrations. 1 vol. 8vo. (*In December.*)

CLINICAL OBSERVATIONS ON FUNCTIONAL NERVOUS DISORDERS By C. HANDFIELD JONES, M.D., Physician to St. Mary's Hospital, &c. Second American Edition. In one handsome octavo volume of 348 pages, cloth, $3 25

CHAMBERS'S MANUAL OF DIET AND REGIMEN IN HEALTH AND SICKNESS. In one handsome octavo volume. Cloth, $2 75.

LINCOLN'S ELECTRO-THERAPEUTICS: a Concise Manual of Medical Electricity. In one very neat royal 12mo. volume, cloth, with illustrations, $1 50.

PAVY'S TREATISE ON THE FUNCTION OF DIGESTION; its Disorders and their Treatment. From the second London edition. In one handsome volume, small octavo, cloth, $2 00.

PAVY'S TREATISE ON FOOD AND DIETETICS. Physiologically and Therapeutically Considered. In one handsome octavo volume of nearly [illegible] pages, cloth, $4 75.

BROWN (LENNOX), F.R.C.S. Ed.,

Senior Surgeon to the Central London Throat and Ear Hospital, etc.,

THE THROAT AND ITS DISEASES. With one hundred Typical Illustrations in colors, and fifty wood engravings, designed and executed by the author. In one very handsome imperial octavo volume of 351pages; cloth, $5 00. (*Now Ready.*)

The author's rare artistic skill has been utilized in the production of one hundred beautiful illustrations in colors, the very best of the kind we have seen, and which have been distributed in ten plates. Fifty wood engravings, designed and executed by the author, appear in the body of the work—these are unusually accurate. In conclusion, we recommend this beautiful volume as an acceptable addition to the library of those engaged in the treatment of diseases of the throat.—*N. Y. Med. Record*, Nov. 9, 1878.

SEILER (CARL), M.D.,

Lecturer on Laryngoscopy at the Univ. of Penna., Chief of the Throat Dispensary at the Univ. Hospital, Phila., etc.

HANDBOOK OF DIAGNOSIS AND TREATMENT OF DISEASES OF THE THROAT AND NASAL CAVITIES. In one handsome royal 12mo. volume, of 156 pages, with 35 illustrations; cloth, $1. (*Just Ready.*)

The intention of the author expressed in the preface to make this little book "serve as a guide to students of laryngoscopy in acquiring the skill requisite to the successful diagnosis and treatment of diseases of the larynx and naso-pharynx" has been most ably carried out. We most heartily commend this book as showing sound judgment in practice, and perfect familiarity with the literature of the specialty it so ably epitomizes.—*Philada. Med. Times*, July 5, 1879.

We can heartily commend this volume to the medical student as a good guide to the study of laryngoscopy and rhinoscopy penned by the hand of a gentleman fully familiar with the subject of which he writes.—*N. Y. Med. Record*, July 19, 1879.

A convenient little handbook, clear, concise, and accurate in its method, and admirably fulfilling its purpose of bringing the subject of which it treats within the comprehension of the general practitioner.—*N. C. Med. Jour.*, June, 1879.

The author has produced a most useful book, as clear and reliable as it is concise. For use in connection with clinical study this little work will prove trustworthy and convenient.—*Detroit Lancet*, Aug. 1879.

FLINT (AUSTIN), M.D.,

Professor of the Principles and Practice of Medicine in Bellevue Hospital Med. College, N. Y.

PHTHISIS: ITS MORBID ANATOMY, ETIOLOGY, SYMPTOMATIC EVENTS AND COMPLICATIONS, FATALITY AND PROGNOSIS, TREATMENT, AND PHYSICAL DIAGNOSIS; in a series of Clinical Studies. By AUSTIN FLINT, M.D., Prof. of the Principles and Practice of Medicine in Bellevue Hospital Med. College, New York. In one handsome octavo volume: $3 50. (*Lately Issued.*)

This book contains an analysis, in the author's lucid style, of the notes which he has made in several hundred cases in hospital and private practice. We commend the book to the perusal of all interested in the study of this disease.—*Boston Med. and Surg. Journal*, Feb. 10, 1876.

BY THE SAME AUTHOR.

A MANUAL OF PERCUSSION AND AUSCULTATION; of the Physical Diagnosis of Diseases of the Lungs and Heart, and of Thoracic Aneurism. In one handsome royal 12mo. volume: cloth, $1 75. (*Just Issued.*)

BY THE SAME AUTHOR.

A PRACTICAL TREATISE ON THE DIAGNOSIS, PATHOLOGY, AND TREATMENT OF DISEASES OF THE HEART. Second revised and enlarged edition. In one octavo volume of 550 pages, with a plate, cloth, $4.

Dr. Flint chose a difficult subject for his researches, and has shown remarkable powers of observation and reflection, as well as great industry, in his treatment of it. His book must be considered the fullest and clearest practical treatise on those subjects, and should be in the hands of all practitioners and students. It is a credit to American medical literature. —*Amer. Journ. of the Med. Sciences*, July, 1860.

BY THE SAME AUTHOR.

A PRACTICAL TREATISE ON THE PHYSICAL EXPLORATION OF THE CHEST AND THE DIAGNOSIS OF DISEASES AFFECTING THE RESPIRATORY ORGANS. Second and revised edition. In one handsome octavo volume of 595 pages, cloth, $4 50.

WILLIAMS'S PULMONARY CONSUMPTION; its Nature, Varieties, and Treatment. With an Analysis of One Thousand Cases to exemplify its duration. In one neat octavo volume of about 350 pages; cloth, $2 50.

SLADE ON DIPHTHERIA; its Nature and Treatment, with an account of the History of its Prevalence in various Countries. Second and revised edition. In one neat royal 12mo. volume, cloth, $1 25.

WALSHE ON THE DISEASES OF THE HEART AND GREAT VESSELS. Third American Edition. In 1 vol. 8vo., 420 pp., cloth, $3 00.

LECTURES ON THE DISEASES OF THE STOMACH. With an Introduction on its Anatomy and Physiology. By WILLIAM BRINTON, M. D., F. R. S. From the second and enlarged London edition. With illustrations on wood. In one handsome octavo *volume of about 300 pages*: cloth, $3 25.

LA ROCHE ON PNEUMONIA. 1 vol. 8vo., cloth, of 500 pages. Price, $3 00.

FULLER ON DISEASES OF THE LUNGS AND AIR-PASSAGES. Their Pathology, Physical Diagnosis, Symptoms, and Treatment. From the second and revised English edition. In one handsome ocatvo volume of about 500 pages: cloth, $3 50.

SMITH ON CONSUMPTION; ITS EARLY AND REMEDIABLE STAGES. 1 vol. 8vo., pp. 254. $2 25.

BASHAM ON RENAL DISEASES: a Clinical Guide to their Diagnosis and Treatment. With Illustrations. In one 12mo. vol. of 304 pages, cloth, $2 00.

LECTURES ON THE STUDY OF FEVER. By A. HUDSON, M.D., M.R.I.A., Physician to the Meath Hospital. In one vol. 8vo., cloth, $2 50.

A TREATISE ON FEVER. By ROBERT D. LYONS, K. C. C. In one octavo volume of 362 pages, cloth, $2 25.

BUMSTEAD (FREEMAN J.), M.D., LL.D.,
Professor of Venereal Diseases at the Col. of Phys. and Surg., New York, &c.

THE PATHOLOGY AND TREATMENT OF VENEREAL DISEASES. Including the results of recent investigations upon the subject. Fourth edition, revised and largely rewritten with the co-operation of R. W. Taylor, M.D., of New York, Prof. of Dermatology in the Univ. of Vt. In one large and handsome octavo volume of over 800 pages, with numerous illustrations. (*Preparing.*)

This work, on its first appearance, immediately took the position of a standard authority on its subject wherever the language is spoken, and the success of an Italian translation shows that it is regarded with equal favor on the Continent of Europe. In repeated editions the author labored sedulously to render it more worthy of its reputation, and in the present revision no pains have been spared to perfect it as far as possible. Several years having elapsed since the publication of the third edition, much material has been accumulated during the interval by the industry of syphilologists, and new views have been enunciated. All this so far as confirmed by observation and experience, has been incorporated; many portions of the volume been rewritten, the series of illustrations has been enlarged and improved, and the whole may be regarded rather as a new work than as a new edition. It is confidently presented as fully on a level with the most advanced condition of syphilology, and as a work to which the practitioner may refer with the certainty of finding clearly and succinctly set forth whatever falls within the scope of such a treatise.

CULLERIER (A.), *and* *BUMSTEAD (FREEMAN J.),*
Surgeon to the Hôpital du Midi.
Professor of Venereal Diseases in the College of Physicians and Surgeons, N. Y.

AN ATLAS OF VENEREAL DISEASES. Translated and Edited by FREEMAN J. BUMSTEAD. In one large imperial 4to. volume of 328 pages, double-columns, with 26 plates, containing about 150 figures, beautifully colored, many of them the size of life; strongly bound in cloth, $17 00; also, in five parts, stout wrappers, at $3 per part.

Anticipating a very large sale for this work, it is offered at the very low price of THREE DOLLARS a Part, thus placing it within the reach of all who are interested in this department of practice. Gentlemen desiring early impressions of the plates would do well to order it without delay. A specimen of the plates and text sent free by mail, on receipt of 25 cents.

We wish for once that our province was not restricted to methods of treatment, that we might say something of the exquisite colored plates in this volume. —*London Practitioner*, May, 1869.

Other writers besides M. Cullerier have given us a good account of the diseases of which he treats, but no one has furnished us with such a complete series of illustrations of the venereal diseases. There is, however, an additional interest and value possessed by the volume before us; for it is an American reprint and translation of M. Cullerier's work, with incidental remarks by one of the most eminent American syphilographers, Mr. Bumstead.—*Brit. and For. Medico-Chir. Review*, July, 1869.

LEE'S LECTURES ON SYPHILIS AND SOME FORMS OF LOCAL DISEASE AFFECTING PRINCIPALLY THE ORGANS OF GENERATION. In one handsome octavo volume; cloth, $2 25.

HILL ON SYPHILIS AND LOCAL CONTAGIOUS DISORDERS. In one handsome octavo volume; cloth, $3 25.

WEST (CHARLES), M.D.,
Physician to the Hospital for Sick Children, London, &c.

LECTURES ON THE DISEASES OF INFANCY AND CHILDHOOD. Fifth American from the sixth revised and enlarged English edition. In one large and handsome octavo volume of 678 pages. Cloth, $4 50; leather, $5 50. (*Lately Issued.*)

Of all the English writers on the diseases of children, there is no one so entirely satisfactory to us as Dr. West. For years we have held his opinion as judicial, and have regarded him as one of the highest living authorities in the difficult department of medical science in which he is most widely known.—*Boston Med. and Surg. Journal*

No medical student can afford to be without this classical book of a great and model physician. Few have the opportunities of Dr. West for observation, and fewer still the peculiar powers necessary for successfully studying the diseases of children. We presume that few medical libraries of a dozen volumes are without the above work. This is true, principally, because it is indispensable to every general practitioner.—*Detroit Rev. of Med. and Pharm.*, June, 1874.

BY THE SAME AUTHOR. (*Lately Issued.*)

ON SOME DISORDERS OF THE NERVOUS SYSTEM IN CHILDHOOD; being the Lumleian Lectures delivered at the Royal College of Physicians of London, in March, 1871. In one volume small 12mo., cloth, $1 00.

BY THE SAME AUTHOR.

LECTURES ON THE DISEASES OF WOMEN. Third American, from the Third London edition. In one neat octavo volume of about 550 pages, cloth, $3 75; leather, $4 75.

CONDIE'S PRACTICAL TREATISE ON THE DISEASES OF CHILDREN. Sixth edition, revised and augmented. In one large octavo volume of nearly 800 closely-printed pages, cloth, $5 25; leather $6 25.

SMITH'S PRACTICAL TREATISE ON THE WASTING DISEASES OF INFANCY AND CHILDHOOD. Second American, from the second revised and enlarged English edition. In one handsome octavo volume, cloth, $2 50.

SMITH (J. LEWIS), M.D.,

Clinical Professor of Diseases of Children in the Bellevue Hospital Med. College, N Y.

A COMPLETE PRACTICAL TREATISE ON THE DISEASES OF CHILDREN. Fourth Edition, revised and enlarged. In one handsome octavo volume of about 750 pages, with illustrations. Cloth, $4 50; leather, $5 50. (*Now Ready.*)

The very marked favor with which this work has been received wherever the English language is spoken, has stimulated the author, in the preparation of the Fourth Edition, to spare no pains in the endeavor to render it worthy in every respect of a continuance of professional confidence. Many portions of the volume have been rewritten, and much new matter introduced, but by an earnest effort at condensation, the size of the work has not been materially increased.

In the period which has elapsed since the third edition of the work, so extensive have been the advances that whole chapters required to be rewritten, and hardly a page could pass without some material correction or addition. This labor has occupied the writer closely, and he has performed it conscientiously, so that the book may be considered a faithful portraiture of an exceptionally wide clinical experience in infantile diseases, corrected by a careful study of the recent literature of the subject.—*Med. and Surg. Reporter*, April 5, 1879.

It is scarcely necessary for us to say the work before us is a standard work upon diseases of children, and that no work has a higher standing than it upon those affections. In consequence of its thorough revision, the work has been made of more value than ever, and may be regarded as fully abreast of the times. We cordially commend it to students and physicians. There is no better work in the language on diseases of children.—*Cincinnati Med. News*, March, 1879.

The author has evidently determined that it shall not lose ground in the esteem of the profession for want of the latest knowledge on that important department of medicine. He has accordingly incorporated in the present edition the useful and practical results of the latest study and experience, both American and foreign, especially those bearing on therapeutics. Altogether the book has been greatly improved, while it has not been greatly increased in size.—*New York Medical Journal*, June, 1879.

This excellent work is so well known that an extended notice at this time would be superfluous. The author has taken advantage of the demand for another new edition to revise in a most careful manner the entire book; and the numerous corrections and additions evince a determination on his part to keep fully abreast with the rapid progress that is being made in the knowledge and treatment of children's diseases. By the adoption of a somewhat closer type, an increase in size of only thirty pages has been necessitated by the new subject matter introduced.—*Boston Med. and Surg. Jour.*, May 29, 1879.

Probably no other work ever published in this country upon a medical subject has reached such a heighth of popularity as has this well-known treatise. As a text and reference-book it is pre-eminently the authority upon diseases of children. It stands deservedly higher in the estimation of the profession than any other work upon the same subject.—*Nashville Journ. of Med. and Surg.*, May, 1879.

The author of this work has acquired an immense experience as physician to three of the large charities of New York in which children are treated. These asylums afford unsurpassed opportunities for observing the effects of different plans of treatment, and the results as embodied in this volume may be accepted with faith, and should be in the possession of all practitioners *now*, in view of the approaching season when the diseases of children always increase. —*Nat. Med. Review*, April, 1879.

SWAYNE (JOSEPH GRIFFITHS), M.D.,

Physician-Accoucheur to the British General Hospital, &c.

OBSTETRIC APHORISMS FOR THE USE OF STUDENTS COMMENCING MIDWIFERY PRACTICE Second American, from the Fifth and Revised London Edition, with Additions by E. R. HUTCHINS, M.D. With Illustrations. In one neat 12mo. volume. Cloth, $1 25. (*Lately Issued.*)

_ See p. 4 of this Catalogue for the terms on which this work is offered as a premium to subscribers to the "AMERICAN JOURNAL OF THE MEDICAL SCIENCES."

CHURCHILL ON THE PUERPERAL FEVER AND OTHER DISEASES PECULIAR TO WOMEN. 1 vol. 8vo., pp. 450, cloth. $2 50.

DEWEES'S TREATISE ON THE DISEASES OF FEMALES. With illustrations. Eleventh Edition with the Author's last improvements and corrections. In one octavo volume of 536 pages, with plates, cloth. $3 00.

MEIGS ON THE NATURE, SIGNS, AND TREATMENT OF CHILDBED FEVER. 1 vol. 8vo., pp. 365, cloth. $2 00.

ASHWELL'S PRACTICAL TREATISE ON THE DISEASES PECULIAR TO WOMEN. Third American, from the Third and revised London edition. 1 vol. 8vo., pp. 528, cloth. $3 50.

HODGE (HUGH L.), M.D.,

Emeritus Professor of Obstetrics, &c., in the University of Pennsylvania.

ON DISEASES PECULIAR TO WOMEN; including Displacements of the Uterus. With original illustrations. Second edition, revised and enlarged. In one beautifully printed octavo volume of 531 pages, cloth, $4 50.

Professor Hodge's work is truly an original one from beginning to end, consequently no one can peruse its pages without learning something new. As a contribution to the study of women's diseases, it is of great value, and is abundantly able to stand on its own merits.—*N. Y. Medical Record*, Sept. 15, 186[illegible].

CHURCHILL (FLEETWOOD), M.D., M.R.I.A.

ON THE THEORY AND PRACTICE OF MIDWIFERY. A new American from the fourth revised and enlarged London edition. With notes and additions by D. FRANCIS CONDIE, M.D., author of a "Practical Treatise on the Diseases of Children," &c. With one hundred and ninety four illustrations. In one very handsome octavo volume of nearly 700 large pages. Cloth, $4 00; leather, $5 00.

MONTGOMERY'S EXPOSITION OF THE SIGNS AND SYMPTOMS OF PREGNANCY. With two exquisite colored plates, and numerous wood-cuts. In 1 vol. 8vo., of nearly 600 pp., cloth, $3 75.

RIGBY'S SYSTEM OF MIDWIFERY. With notes and Additional Illustrations. Second American edition. One volume octavo, cloth, [illegible] pages, $2 50.

THOMAS (*T. GAILLARD*), *M.D.*,

Professor of Obstetrics, &c., in the College of Physicians and Surgeons, N. Y., &c.

A PRACTICAL TREATISE ON THE DISEASES OF WOMEN. Fourth edition, enlarged and thoroughly revised. In one large and handsome octavo volume of 800 pages, with 191 illustrations. Cloth, $5 00; leather, $6 00. (*Just Issued.*)

The author has taken advantage of the opportunity afforded by the call for another edition of this work to render it worthy a continuance of the very remarkable favor with which it has been received. Every portion has been subjected to a conscientious revision, and no labor has been spared to make it a complete treatise on the most advanced condition of its important subject.

A work which has reached a fourth edition, and that, too, in the short space of five years, has achieved a reputation which places it almost beyond the reach of criticism, and the favorable opinions which we have already expressed of the former editions seem to require that we should do little more than announce this new issue. We cannot refrain from saying that, as a practical work, this is second to none in the English, or, indeed, in any other language. The arrangement of the contents, the admirably clear manner in which the subject of the differential diagnosis of several of the diseases is handled, leave nothing to be desired by the practitioner who wants a thoroughly clinical work, one to which he can refer in difficult cases of doubtful diagnosis with the certainty of gaining light and instruction. Dr. Thomas is a man with a very clear head and decided views, and there seems to be nothing which he so much dislikes as hazy notions of diagnosis and blind routine and unreasonable therapeutics. The student who will thoroughly study this book and test its principles by clinical observation, will certainly not be guilty of these faults.—*London Lancet*, Feb. 13, 1875.

Reluctantly we are obliged to close this unsatisfactory notice of so excellent a work, and in conclusion would remark that, as a teacher of gynæcology, both didactic and clinical, Prof. Thomas has certainly taken the lead far ahead of his *confrères*, and as an author he certainly has met with unusual and merited success.—*Am. Journ. of Obstetrics*, Nov. 1874.

This volume of Prof. Thomas in its revised form is classical without being pedantic, full in the details of anatomy and pathology, without ponderous translation of pages of German literature, describes distinctly the details and difficulties of each operation, without wearying and useless minutiæ, and is in all respects a work worthy of confidence, justifying the high regard in which its distinguished author is held by the profession.—*Am. Supplement, Obstet. Journ.*, Oct. 1874.

Professor Thomas fairly took the Profession of the United States by storm when his book first made its appearance early in 1868. Its reception was simply enthusiastic, notwithstanding a few adverse criticisms from our transatlantic brethren, the first large edition was rapidly exhausted, and in six months a second one was issued, and in two years a third one was announced and published, and we are now promised the fourth. The popularity of this work was not ephemeral, and its success was unprecedented in the annals of American medical literature. Six years is a long period in medical scientific research, but Thomas's work on "Diseases of Women" is still the leading native production of the United States. The order, the matter, the absence of theoretical disputativeness, the fairness of statement, and the elegance of diction, preserved throughout the entire range of the book, indicate that Professor Thomas did not overestimate his powers when he conceived the idea and executed the work of producing a new treatise upon diseases of women.—PROF. PALLEN, in *Louisville Med. Journal*, Sept. 1874.

BARNES (*ROBERT*), *M.D.*, *F.R.C.P.*,

Obstetric Physician to St. Thomas's Hospital, &c.

A CLINICAL EXPOSITION OF THE MEDICAL AND SURGICAL DISEASES OF WOMEN. Second American, from the Second Enlarged and Revised English Edition. In one handsome octavo volume, of 784 pages, with 181 illustrations. Cloth, $4 50; leather, $5 50. (*Just Ready.*)

The call for a new edition of Dr. Barnes's work on the Diseases of Females has encouraged the author to make it even more worthy of the favor of the profession than before. By a rearrangement and careful pruning space has been found for a new chapter on the Gynæcological Relations of the Bladder and Bowel Disorders, without increasing the size of the book, while many new illustrations have been introduced where experience has shown them to be needed. It is therefore hoped that the volume will be found to reflect thoroughly and accurately the present condition of gynæcological science.

Dr. Barnes stands at the head of his profession in the old country, and it requires but scant scrutiny of his book to show that it has been sketched by a master. It is plain, practical common sense; shows very deep research without being pedantic; is eminently calculated to inspire enthusiasm without inculcating rashness; points out the dangers to be avoided as well as the success to be achieved in the various operations connected with this branch of medicine; and will do much to smooth the rugged path of the young gynæcologist and relieve the perplexity of the man of mature years.—*Canadian Journ. of Med. Science*, Nov. 1878.

We pity the doctor who, having any considerable practice in diseases of women, has no copy of "Barnes" for daily consultation and instruction. It is at once a book of great learning, research, and individual experience, and at the same time eminently practical. That it has been appreciated by the profession, both in Great Britain and in this country, is shown by the second edition following so soon upon the first.—*Am. Practitioner*, Nov. 1878.

Dr. Barnes's work is one of a practical character, largely illustrated from cases in his own experience, but by no means confined to such, as will be learned from the fact that he quotes from no less than 628 medical authors in numerous countries. Coming from such an author, it is not necessary to say that the work is a valuable one, and should be largely consulted by the profession.—*Am. Supp. Obstetrical Journ. Gt. Britain and Ireland*, Oct. 1878.

No other gynæcological work holds a higher position, having become an authority everywhere in diseases of women. The work has been brought fully abreast of present knowledge. Every practitioner of medicine should have it upon the shelves of his library, and the student will find it a superior text-book.—*Cincinnati Med. News*, Oct. 1878.

This second revised edition, of course, deserves all the commendation given to its predecessor, with the additional one that it appears to include all or nearly all the additions to our knowledge of its subject that have been made since the appearance of the first edition. The American references are, for an English work, especially full and appreciative, and we can cordially recommend the volume to American readers.—*Journ. of Nervous and Mental Disease*, Oct. 1878.

This second edition of Dr. Barnes's great work comes to us containing many additions and improvements which bring it up to date in every feature. The excellences of the work are too well known to require enumeration, and we hazard the prophecy that they will for many years maintain its high position as a standard text-book and guide book for students and practitioners.—*N. C. Med. Journ.*, Oct. 1878.

EMMET (THOMAS ADDIS), M.D.

Surgeon to the Woman's Hospital, New York, etc.

THE PRINCIPLES AND PRACTICE OF GYNÆCOLOGY, for the use of Students and Practitioners of Medicine. In one large and very handsome octavo volume of 856 pages, with 130 illustrations. Cl th, $5; leather, $6. (*Just Ready.*)

Dr Emmet is so widely known as among the most eminent of those who have made gynæcology a peculiarly American science that the profession cannot fail to welcome a work in which he has condensed the results of his long and extensive experience. He has sought to consider the whole subject of the diseases peculiar to females in a manner which will adapt the volume, not only to the wants of the student as a text-book, but to those of the practitioner as an aid in the emergencies of daily practice. A special feature of the work will be found in the numerous condensed tables, which convey at a glance, and within the narrowest compass, the conclusions to be drawn from the many thousand cases which have passed under the care of the author. With trifling exceptions, the illustrations are all original, and the volume will be found in every point of typographical execution worthy of the distinguished position which is confidently anticipated for it.

It may be said that he has had opportunities for observation and experience, for unfettered and unrestrained experimentation, and for testing the value of the original and dazzling operations first proposed and performed by his illustrious predecessors before referred to, and for devising new operations and discovering pathological causes never before suspected or described, which no man in the profession has ever before secured. We also think that the readers of this work will agree with us, after its careful perusal, that he has a rare capacity for discriminating analysis, and generally for philosophical deduction and the equally important quality of patient, honest, continued work. For the work as a whole, we have only praise. It deserves and will receive the careful study of all who desire to keep on a level with the progress of Gynæcology. It embodies a larger amount of carefully analyzed personal experience in a unique field for observation than any volume on Diseases of Women which has yet been published. Its great merit consists in this—coming as it does from a thoroughly honest, competent, and able specialist, who became a specialist only after an excellent training and experience as a general hospital physician and surgeon. The book is not one to be hastily glanced over, but will secure the critical study of Gynæcologists. Not only its style, which is individual and somewhat peculiar, but the new facts which it brings out, its original suggestions, its numerous and important statistical tables, and, in some instances, its unexpected deductions, will compel attention, and will form the basis for a great deal of Gynæcological study and literature in the future. All who make themselves familiar with the contents of this volume, will feel assured that Dr Emmet has well earned and well deserved the reputation which he has already won, as one of the great Gynæcologists of the present age.—*The Am. Journ. of Obstetrics*, April, 1879.

We have examined this book with something more than ordinary care, and now lay it aside captivated by our impressions of it. From first to last, each page grows in interest, and one is struck with the practical tone of all that is said. It is indeed the gynæcological work for the practitioner. Its equal is not yet published, or at least we have not seen it. We cannot send this notice forward without reiterating that, in our estimation, Emmet's Principles and Practice of Gynæcology is undoubtedly the best book for the student, as well as the general practitioner, which is at present published.—*Va. Med. Monthly*, May, 1879.

The advent of this important work has for some time been anxiously expected by all who are interested in the subject of gynæcology, both here and abroad. The clinics held at the Woman's Hospital, and the minor writings referred to have acquired for Dr. Emmet a reputation for skill as an operator, and experience in the special branch to which he has exclusively confined his attention, which is probably unrivalled by any one on this continent. The anticipations which have been awakened regarding the character of this extended treatise, are not likely to be disappointed, if one may judge from the very cursory review we have made of its contents.—*New Remedies*, May, 1879

Few have had the rare opportunities of Dr. Emmet, and none have better improved that which was at their disposal. Sure are we that any practitioner of medicine, specialist, or otherwise, who will read carefully this volume, will find that he possesses a clearer insight into a thousand problems that have hitherto perplexed him. It is one of the best original works on the diseases of women published in this or any other land. We heartily commend it to the careful study of every medical man. —*Detroit Lancet*, May, 1879.

We are satisfied that whoever reads the book carefully will agree with us that it is the best work on gynæcology that has ever been written. This is high praise, but we have no hesitation in giving it. —*St. Louis Clin. Record*, May, 1879.

CHADWICK (JAMES R.), A.M., M.D.

A MANUAL OF THE DISEASES PECULIAR TO WOMEN. In one neat volume, royal 12mo, with illustrations. (*Preparing.*)

RAMSBOTHAM (FRANCIS H.), M.D.

THE PRINCIPLES AND PRACTICE OF OBSTETRIC MEDICINE AND SURGERY, in reference to the Process of Parturition. A new and enlarged edition, thoroughly revised by the author. With additions by W. V. KEATING, M. D., Professor of Obstetrics, &c., in the Jefferson Medical College, Philadelphia. In one large and handsome imperial octavo volume of 650 pages, strongly bound in leather, with raised bands; with sixty-four beautiful plates, and numerous wood-cuts in the text, containing in all nearly 200 large and beautiful figures. $7 00

WINCKEL (F.),

Professor and Director of the Gynæcological Clinic in the University of Rostock.

A COMPLETE TREATISE ON THE PATHOLOGY AND TREATMENT OF CHILDBED, for Students and Practitioners. Translated, with the consent of the author, from the Second German Edition, by JAMES READ CHADWICK, M.D. In one octavo volume. Cloth, $4 00. (*Lately Issued.*)

TANNER (THOMAS H.), M.D.

ON THE SIGNS AND DISEASES OF PREGNANCY. First American from the Second and Enlarged English Edition. With four colored plates and illustrations on wood. In one handsome octavo volume of about 500 pages, cloth, $4 25.

PLAYFAIR (W. S.), M.D., F.R.C.P.,
Professor of Obstetric Medicine in King's College, etc. etc.

A TREATISE ON THE SCIENCE AND PRACTICE OF MIDWIFERY.

Second American, from the Second and Revised English Edition. Edited, with Additions, by Robert P. Harris, M.D. In one handsome octavo volume of 639 pages, with 182 illustrations. Cloth, $4.00; Leather, $5.00. (*Just Ready.*)

The position which this work has so quickly taken in this country as an authoritative text-book renders any extended consideration of its plan and scope unnecessary. Its merits, which are many, have already found their way to the appreciation of students and practitioners alike in the length and breadth of the land.—*Am. Supp. Obstet. Journ. of Gt. Britain and Ireland*, Oct. 1878.

This excellent text-book has been submitted to a thorough and careful revision, and will be found fully up to the times in every department. The notes by the American editor enhance the value of the work for the American student. Those on the use of forceps are particularly good, and constitute by themselves a valuable chapter.—*N. Y. Med. Journ.*, Nov. 1878.

The best work on the subject ever published in the English language. It is written in a clear, pleasant style, without that verbosity which characterizes some modern and highly pretentious works. The author is quite up with the times, both in practice and theory. It is the best text-book we have for students, and sufficiently full of detail to supply all the wants of the practitioner. We would gladly see it in the hands of all who practise midwifery.—*Canadian Journ. of Med. Sci.*, Nov. 1878.

Probably this is the very best and most useful manual of midwifery now available to the profession. It is written in lucid, scholarly English, which some of our cis-Atlantic writers would do well to imitate. There has been no attempt to swell the magnitude of the work by fine writing, or by lengthy discussions of obscure points of which no trustworthy solution has yet been reached; on the contrary, the tendency is throughout obviously towards simplicity. The chapter upon the Mechanism of Labor (which ought to be the crowning chapter in a treatise on obstetrics) is remarkably clear and good, and is divested of those features which in almost every other work we know lets only darkness instead of light in upon the subject.—*N. C. Med. Journ.*, Oct. 1878.

BARNES (FANCOURT), M.D.,
Physician to the General Lying-in Hospital, London.

A MANUAL OF MIDWIFERY FOR MIDWIVES AND MEDICAL STUDENTS.

With 50 illustrations. In one neat royal 12mo. volume of 200 pages; cloth, $1 25. (*Now Ready.*)

The publisher takes pleasure in presenting this manual of midwifery to students and the junior members of the profession, feeling assured that it will be found of great value, for though compressed in size, the language is concise and plain; and while not entering upon the general discussion of obstetric operations, most distinct directions are given for the management of childbed, its accidents and emergencies and the previous and subsequent treatment of the patient.

The book is written in plain, and as far as possible in untechnical language. Any intelligent midwife or medical student can easily comprehend the directions. It will undoubtedly fill a want, and will be popular with those for whom it has been prepared. The examining questions at the back will be found very useful.—*Cincinnati Med. News*, Aug. 1879.

The style is clear, and the book will, doubtless, be useful to the persons for whom it is intended.—*London Med. Times and Gazette*, Aug. 30, 1879.

The book is written with as little technical language as possible. Any intelligent midwife or medical student can easily understand the directions. It will undoubtedly be found very useful.—*Ohio Med. Recorder*, Sept. 1879.

THE OBSTETRICAL JOURNAL. (*Free of postage for* 1879.)

THE OBSTETRICAL JOURNAL of Great Britain and Ireland;

Including Midwifery, and the Diseases of Women and Infants. With an American Supplement, edited by J. V. Ingham, M.D. A monthly of about 96 octavo pages, very handsomely printed. Subscription, Five Dollars per annum. Single Numbers, 50 cents each.

Commencing with April, 1873, the Obstetrical Journal consists of Original Papers by British and Foreign Contributors; Transactions of the Obstetrical Societies in England and abroad; Reports of Hospital Practice; Reviews and Bibliographical Notices; Articles and Notes, Editorial, Historical, Forensic, and Miscellaneous; Selections from Journals; Correspondence, &c. Collecting together the vast amount of material daily accumulating in this important and rapidly improving department of medical science, the value of the information which it presents to the subscriber may be estimated from the character of the gentlemen who have already promised their support, including such names as those of Drs. Atthill, Aveling, Robert Barnes, J. Henry Bennet, Nathan Bozeman, Thomas Chambers, Fleetwood Churchill, Charles Clay, John Clay, Matthews Duncan, Arthur Farre, Robert Greenhalgh, Graily Hewitt, Braxton Hicks, Alfred Meadows, W. Leishman, Alex. Simpson, Heywood Smith, Tyler Smith, Edward J. Tilt, Lawson Tait, Spencer Wells, &c. &c.; in short, the representative men of British Obstetrics and Gynæcology.

In order to render the Obstetrical Journal fully adequate to the wants of the American profession, each number contains a Supplement devoted to the advances made in Obstetrics and Gynæcology on this side of the Atlantic. This portion of the Journal is under the editorial charge of Dr. J. V. Ingham, to whom editorial communications, exchanges, books for review, &c., may be addressed, to the care of the publisher.

⁂ Complete sets from the beginning can no longer be furnished, but subscriptions can commence with January, 1879, or Vol. VII., No 1, April, 1879.

LEISHMAN (WILLIAM), M.D.,

Regius Professor of Midwifery in the University of Glasgow, &c.

A SYSTEM OF MIDWIFERY, INCLUDING THE DISEASES OF PREGNANCY AND THE PUERPERAL STATE.

Third American edition, revised by the Author, with additions by JOHN S. PARRY, M.D., Obstetrician to the Philadelphia Hospital, &c. In one large and very handsome octavo volume, with about two hundred illustrations. (*Shortly.*)

AUTHOR'S PREFACE.

The publication of a third American edition of his work affords the author an opportunity, of which he gladly avails himself, of expressing the great gratification which he has experienced in the generous appreciation of his labors by his colleagues in America. Of the many criticisms which have appeared, none have been more valuable or useful to him than those of the American medical press. The methods of teaching on his side of the Atlantic being somewhat different, it has been found necessary to make some modifications in order to make this and the previous edition quite intelligible. This has been ably done by Dr. John S. Parry; and, without committing himself to all that has been added, the author has much pleasure in acknowledging the courtesy and ability with which this task has been performed. In the preparation of the present edition, such alterations and modifications have been made as the progress of Obstetrical Science seems to require. The large circulation which the work has attained, has, indeed, imposed this duty upon the author as one to be conscientiously and carefully discharged, and in its performance he has been under many obligations to Dr. James Finlayson, which he has much pleasure in acknowledging.

PARRY (JOHN S.), M.D.,

Obstetrician to the Philadelphia Hospital, Vice-Prest. of the Obstet. Society of Philadelphia.

EXTRA-UTERINE PREGNANCY: ITS CLINICAL HISTORY, DIAGNOSIS, PROGNOSIS, AND TREATMENT.

In one handsome octavo volume. Cloth, $2 50. (*Lately Issued.*)

HODGE (HUGH L.), M.D.,

Emeritus Professor of Midwifery, &c., in the University of Pennsylvania, &c.

THE PRINCIPLES AND PRACTICE OF OBSTETRICS.

Illustrated with large lithographic plates containing one hundred and fifty-nine figures from original photographs, and with numerous wood-cuts. In one large and beautifully printed quarto volume of 550 double-columned pages, strongly bound in cloth, $14.

The work of Dr. Hodge is something more than a simple presentation of his particular views in the department of Obstetrics; it is something more than an ordinary treatise on midwifery; it is, in fact, a cyclopædia of midwifery. He has aimed to embody in a single volume the whole science and art of Obstetrics. An elaborate text is combined with accurate and varied pictorial illustrations, so that no fact or principle is left unstated or unexplained.—*Am. Med Times*, Sept. 3, 1864.

It is very large, profusely and elegantly illustrated, and is fitted to take its place near the works of great obstetricians. Of the American works on the subject it is decidedly the best.—*Edinb. Med. Jour.*, Dec. 1864.

⁂ Specimens of the plates and letter-press will be forwarded to any address, free by mail, on receipt of six cents in postage stamps.

STIMSON (LEWIS A.), A.M., M.D.,

Surgeon to the Presbyterian Hospital.

A MANUAL OF OPERATIVE SURGERY.

In one very handsome royal 12mo. volume of about 500 pages, with 332 illustrations; cloth, $2 50. (*Now Ready*)

The work before us is a well printed, profusely illustrated manual of over four hundred and seventy pages. The novice, by a perusal of the work, will gain a good idea of the general domain of operative surgery, while the practical surgeon has presented to him within a very concise and intelligible form the latest and most approved selections of operative procedure. The precision and conciseness with which the different operations are described enable the author to compress an immense amount of practical information in a very small compass.—*N. Y. Medical Record*, Aug. 3, 1878.

This volume is devoted entirely to operative surgery, and is intended to familiarize the student with the details of operations and the different modes of performing them. The work is handsomely illustrated, and the descriptions are clear and well drawn. It is a clever and useful volume; every student should possess one. The preparation of this work does away with the necessity of pondering over larger works on surgery for descriptions of operations, as it presents in a nut-shell just what is wanted by the surgeon without an elaborate search to find it.—*Md. Med Journal*, Aug. 1878.

The author's conciseness and the repleteness of the work with valuable illustrations entitle it to be classed with the text-books for students of operative surgery, and as one of reference to the practitioner. —*Cincinnati Lancet and Clinic*, July 27, 1878.

SKEY'S OPERATIVE SURGERY. In 1 vol. 8vo. cl., of 650 pages; with about 100 wood-cuts. $3 25.

COOPER'S LECTURES ON THE PRINCIPLES AND PRACTICE OF SURGERY. In 1 vol. 8vo. cl'h, 750 p. $2.

GIBSON'S INSTITUTES AND PRACTICE OF SURGERY. Eighth edit'n, improved and altered. With thirty-four plates. In two handsome octavo volumes, about 1000 pp., leather, raised bands. $6 50.

THE PRINCIPLES AND PRACTICE OF SURGERY. By WILLIAM PIRRIE, F.R.S.E., Profes'r of Surgery in the University of Aberdeen. Edited by JOHN NEILL, M.D., Professor of Surgery in the Penna. Medical College, Surg'n to the Pennsylvania Hospital, &c. In one very handsome octavo vol. of 780 pages, with 316 illustrations, cloth, $3 75.

MILLER'S PRINCIPLES OF SURGERY. Fourth American, from the Third Edinburgh Edition. In one large 8vo. vol. of 700 pages, with 340 illustrations, cloth, $3 75.

MILLER'S PRACTICE OF SURGERY. Fourth American, from the last Edinburgh Edition. Revised by the American editor. In one large 8vo. vol. of nearly 700 pages, with 364 illustrations; cloth, $3 75.

GROSS (SAMUEL D.), M.D.,

Professor of Surgery in the Jefferson Medical College of Philadelphia.

SYSTEM OF SURGERY: Pathological, Diagnostic, Therapeutic, and Operative. Illustrated by upwards of Fourteen Hundred Engravings. Fifth edition carefully revised, and improved. In two large and beautifully printed imperial octavo volumes of about 2300 pp., strongly bound in leather, with raised bands, $15. (*Just Issued.*)

The continued favor, shown by the exhaustion of successive large editions of this great work, proves that it has successfully supplied a want felt by American practitioners and students. In the present revision no pains have been spared by the author to bring it in every respect fully up to the day. To effect this a large part of the work has been rewritten, and the whole enlarged by nearly one-fourth, notwithstanding which the price has been kept at its former very moderate rate. By the use of a close, though very legible type, an unusually large amount of matter is condensed in its pages, the two volumes containing as much as four or five ordinary octavos. This, combined with the most careful mechanical execution, and its very durable binding renders, it one of the cheapest works accessible to the profession. Every subject properly belonging to the domain of surgery is treated in detail, so that the student who possesses this work may be said to have in it a surgical library.

We have now brought our task to a conclusion, and have seldom read a work with the practical value of which we have been more impressed. Every chapter is so concisely put together, that the busy practitioner, when in difficulty, can at once find the information he requires. His work, on the contrary, is cosmopolitan, the surgery of the world being fully represented in it. The work, in fact, is so historically unprejudiced, and so eminently practical, that it is almost a false compliment to say that we believe it to be destined to occupy a foremost place as a work of reference, while a system of surgery like the present system of surgery is the practice of surgeons. The printing and binding of the work is unexceptionable; indeed, it contrasts, in the latter respect, remarkably with English medical and surgical cloth-bound publications, which are generally so wretchedly stitched as to require re-binding before they are any time in use.—*Dub. Journ. of Med. Sci.*, March, 1874.

Dr. Gross's Surgery, a great work, has become still greater, both in size and merit, in its most recent form. The difference in actual number of pages is not more than 130, but, the size of the page having been increased to what we believe is technically termed "elephant," there has been room for considerable additions, which, together with the alterations, are improvements.—*Lond. Lancet*, Nov. 16, 1872.

It combines, as perfectly as possible, the qualities of a text-book and work of reference. We think this last edition of Gross's "Surgery," will confirm his title of "*Primus inter Pares.*" It is learned, scholar-like, methodical, precise, and exhaustive. We scarcely think any living man could write so complete and faultless a treatise, or comprehend more solid, instructive matter in the given number of pages. The labor must have been immense, and the work gives evidence of great powers of mind, and the highest order of intellectual discipline and methodical disposition, and arrangement of acquired knowledge and personal experience.—*N.Y. Med. Journ.*, Feb. 1873.

As a whole, we regard the work as the representative "System of Surgery" in the English language.—*St. Louis Medical and Surg. Journ.*, Oct. 1872.

The two magnificent volumes before us afford a very complete view of the surgical knowledge of the day. Some years ago we had the pleasure of presenting the first edition of Gross's Surgery to the profession as a work of unrivalled excellence; and now we have the result of years of experience, labor, and study, all condensed upon the great work before us. And to students or practitioners desirous of enriching their library with a treasure of reference, we can simply commend the purchase of these two volumes of immense research.—*Cincinnati Lancet and Observer*, Sept. 1872.

A complete system of surgery—not a mere text-book of operations, but a scientific account of surgical theory and practice in all its departments.—*Brit. and For. Med. Chir. Rev.*, Jan. 1873.

BY THE SAME AUTHOR.

A PRACTICAL TREATISE ON THE DISEASES, INJURIES, and Malformations of the Urinary Bladder, the Prostate Gland, and the Urethra. Third Edition, thoroughly Revised and Condensed, by SAMUEL W. GROSS, M.D., Surgeon to the Philadelphia Hospital. In one handsome octavo volume of 574 pages, with 170 illustrations: cloth, $4 50. (*Just Issued.*)

For reference and general information, the physician or surgeon can find no work that meets their necessities more thoroughly than this, a revised edition of an excellent treatise, and no medical library should be without it. Replete with handsome illustrations and good ideas, it has the unusual advantage of being easily comprehended, by the reasonable and practical manner in which the various subjects are systematized and arranged. We heartily recommend it to the profession as a valuable addition to the important literature of diseases of the urinary organs.—*Atlanta Med. Journ.*, Oct. 1876.

It is with pleasure we now again take up this old work in a decidedly new dress. Indeed, it must be regarded as a new book in very many of its parts. The chapters on "Diseases of the Bladder," "Prostate Body," and "Lithotomy," are splendid specimens of descriptive writing; while the chapter on "Stricture" is one of the most concise and clear that we have ever read.—*New York Med. Journ.*, Nov. 1876.

BY THE SAME AUTHOR.

A PRACTICAL TREATISE ON FOREIGN BODIES IN THE AIR-PASSAGES. In 1 vol. 8vo., with illustrations, pp. 468, cloth, $2 75.

DRUITT (ROBERT), M.R.C.S., &c.

THE PRINCIPLES AND PRACTICE OF MODERN SURGERY. A new and revised American, from the eighth enlarged and improved London edition. Illustrated with four hundred and thirty-two wood engravings. In one very handsome octavo volume, of nearly 700 large and closely printed pages, cloth, $4 00; leather, $5 00.

All that the surgical student or practitioner could desire.—*Dublin Quarterly Journal.*

It is a most admirable book. We do not know when we have examined one with more pleasure.—*Boston Med. and Surg. Journal.*

In Mr. Druitt's book, though containing only some seven hundred pages, both the principles and the practice of surgery are treated, and so clearly and perspicuously, as to elucidate every important topic. We have examined the book most thoroughly, and can say that this success is well merited. His book moreover, possesses the inestimable advantages of having the subjects perfectly well arranged and classified, and of being written in a style at once clear and succinct.—*Am. Journal of Med. Sciences.*

ASHHURST (JOHN, Jr.), M.D.,

Prof. of Clinical Surgery, Univ of Pa., Surgeon to the Episcopal Hospital, Philadelphia

THE PRINCIPLES AND PRACTICE OF SURGERY.

Second edition, enlarged and revised. In one very large and handsome octavo volume of over 1000 pages, with 542 illustrations. Cloth, $6; leather, $7. (*Just Ready.*)

Conscientiousness and thoroughness are two very marked traits of character in the author of this book. Out of these traits largely has grown the success of his mental fruit in the past, and the present offer seems in no wise an exception to what has gone before. The general arrangement of the volume is the same as in the first edition, but every part has been carefully revised, and much new matter added.—*Phila. Med. Times*, Feb. 1, 1879.

We have previously spoken of Dr. Ashhurst's work in terms of praise. We wish to reiterate those terms here, and to add that no more satisfactory representation of modern surgery has yet fallen from the press. In point of judicial fairness, of power of condensation, of accuracy and conciseness of expression and thoroughly good English, Prof. Ashhurst has no superior among the surgical writers in America.—*Am. Practitioner*, Jan. 1879.

The attempt to embrace in a volume of 1000 pages the whole field of surgery, general and special, would be a hopeless task unless through the most tireless industry in collating and arranging, and the wisest judgment in condensing and excluding. These facilities have been abundantly employed by the author, and he has given us a most excellent treatise, brought up by the revision for the second edition to the latest date. Of course this book is not designed for specialists, but as a course of general surgical knowledge and for general practitioners, and as a text-book for students it is not surpassed by any that has yet appeared, whether of home or foreign authorship.—*N. Carolina Med. Journal*, Jan. 1879.

Ashhurst's Surgery is too well known in this country to require special commendation from us. This, its second edition, enlarged and thoroughly revised, brings it nearer our idea of a model text-book than any recently published treatise. Though numerous additions have been made, the size of the work is not materially increased. The main trouble of text-books of modern times is that they are too cumbersome. The student needs a book which will furnish him the most information in the shortest time. In every respect this work of Ashhurst is the model text-book—full, comprehensive and compact.—*Nashville Jour. of Med. and Surg.*, Jan. '79.

The favorable reception of the first edition is a guarantee of the popularity of this edition, which is fresh from the editor's hands with many enlargements and improvements. The author of this work is deservedly popular as an editor and writer, and his contributions to the literature of surgery have gained for him wide reputation. The volume now offered the profession will add new laurels to those already won by previous contributions. We can only add that the work is well arranged, filled with practical matter, and contains in brief and clear language all that is necessary to be learned by the student of surgery whilst in attendance upon lectures, or the general practitioner in his daily routine practice.—*Md. Med. Journal*, Jan. 1879.

The fact that this work has reached a second edition so very soon after the publication of the first one, speaks more highly of its merits than anything we might say in the way of commendation. It seems to have immediately gained the favor of students and physicians.—*Cincin. Med. News*, Jan. '79.

BRYANT (THOMAS), F.R.C.S.,

Surgeon to Guy's Hospital.

THE PRACTICE OF SURGERY.

Second American, from the Second and Revised English Edition. With Six Hundred and Seventy-two Engravings on Wood. In one large and very handsome imperial octavo volume of over 1000 large and closely printed pages. Cloth, $6; leather, $7. (*Just Ready.*)

This work has enjoyed the advantage of two thorough revisions at the hand of the author since the appearance of the first American edition, resulting in a very notable enlargement of size and improvement of matter. In England this has led to the division of the work into two volumes, which are here comprised in one, the size being increased to a large imperial octavo, printed on a condensed but clear type. The series of illustrations has undergone a like revision, and will be found correspondingly improved.

The marked success of the work on both sides of the Atlantic shows that the author has succeeded in the effort to give to student and practitioner a sound and trustworthy guide in the practice of Surgery; while the simultaneous appearance of the present edition in England and in this country affords to the American reader the benefit of the most recent advances made abroad in surgical science.

There are so many text-books of surgery, so many written by skilled and distinguished hands, that to obtain the honor of a third edition in England is no light praise. Mr. Bryant merits this, by clearness of style, and good judgment in selecting the operations he recommends, in his new editions he goes carefully over the old grounds, in light of later research. On these and many allied points, Mr. Bryant is a calm and unpartisan observer, and his book throughout has the great merit of maintaining the true scientific, judicial tone of mind.—*Med. and Surg. Reporter*, March 22, 1879.

The work before us is the American reprint of the last London edition, and has the advantage over the latter in being of more convenient size, and in being compressed into one volume. The author has rewritten the greater part of the work, and has succeeded, in the amount of new matter added, in making it markedly distinctive from previous editions. A few extra pages have been added, and also a few new illustrations introduced. The publishers have presented the work in a creditable style. As a concise and practical manual of British surgery it is perhaps without an equal, and will doubtless always be a favorite text-book with the student and practitioner.—*N. Y. Med. Record*, March 22, 1879.

Another edition of this manual having been called for, the author has availed himself of the opportunity to make no few alterations in the substance as well as in the arrangement of the work, and, with a view to its improvement, has recast the materials and revised the whole. We ourselves are of the opinion that there is no better work on surgery extant.—*Cincinnati Med. News*, March, 1879

Bryant's Surgery has been favorably received from the first, and evidently grows in the esteem of the profession with each succeeding edition. In glancing over the volume before us we find proof in almost every chapter of the thorough revision which the work has undergone, many parts having been cut out and replaced by matter entirely fresh.—*N. Y. Med. Journ.*, April, 1879.

Welcome as the new edition is, and as much as it is entitled to commendation, yet its appearance at this time is, in a certain sense, a matter of regret, as it will be in competition with another work, lately issued from the same press. But, the difficult task of forming a judgment as to the relative merits of Bryant and Ashhurst we will not attempt, but predict that, considering the high excellence of both, many others will likewise be forced to hesitate long in making choice between them.—Cincinnati Lancet and Clinic, March 22, 1879.

ERICHSEN (JOHN E.),

Professor of Surgery in University College, London, etc.

THE SCIENCE AND ART OF SURGERY; being a Treatise on Surgical Injuries, Diseases, and Operations. Carefully revised by the author from the Seventh and enlarged English Edition. Illustrated by eight hundred and sixty two engravings on wood. In two large and beautiful octavo volumes of nearly 2000 pages: cloth, $8 50; leather, $10 50. (*Now Ready*.)

In revising this standard work the author has spared no pains to render it worthy of a continuance of the very marked favor which it has so long enjoyed, by bringing it thoroughly on a level with the advance in the science and art of surgery made since the appearance of the last edition. To accomplish this has required the addition of about two hundred pages of text, while the illustrations have undergone a marked improvement. A hundred and fifty additional wood-cuts have been inserted, while about fifty other new ones have been substituted for figures which were not deemed satisfactory. In its enlarged and improved form it is therefore presented with the confident anticipation that it will maintain its position in the front rank of text-books for the student, and of works of reference for the practitioner, while its exceedingly moderate price places it within the reach of all.

The seventh edition is before the world as the last word of surgical science. There may be monographs which excel it upon certain points, but as a conspectus upon surgical principles and practice it is unrivalled. It will well reward practitioners to read it, for it has been a peculiar province of Mr. Erichsen to demonstrate the absolute interdependence of medical and surgical science. We need scarcely add, in conclusion, that we heartily commend the work to students that they may be grounded in a sound faith, and to practitioners as an invaluable guide at the bedside.—*Am. Practitioner*, April, 1878.

It is no idle compliment to say that this is the best edition Mr. Erichsen has ever produced of his well-known book. Besides inheriting the virtues of its predecessors, it possesses excellences quite its own. Having stated that Mr. Erichsen has incorporated into this edition every recent improvement in the science and art of surgery, it would be a supererogation to give a detailed criticism. In short, we unhesitatingly aver that we know of no other single work where the student and practitioner can gain at once so clear an insight into the principles of surgery, and so complete a knowledge of the exigencies of surgical practice.—*London Lancet*, Feb. 14, 1878

For the past twenty years Erichsen's Surgery has maintained its place as the leading text-book, not only in this country, but in Great Britain. That it is able to hold its ground, is abundantly proven by the thoroughness with which the present edition has been revised, and by the large amount of valuable material that has been added. Aside from this, one hundred and fifty new illustrations have been inserted, including quite a number of microscopical appearances of pathological processes. So marked is this change for the better, that the work almost appears as an entirely new one.—*Med. Record*, Feb. 23, 1878.

Of the many treatises on Surgery which it has been our task to study, or our pleasure to read, there is none which in all points has satisfied us so well as the classic treatise of Erichsen. His polished, clear style, his freedom from prejudice and hobbies, his unsurpassed grasp of his subject, and vast clinical experience, qualify him admirably to write a model text-book. When we wish, at the least cost of time, to learn the most of a topic in surgery, we turn, by preference, to his work. It is a pleasure, therefore, to see that the appreciation of it is general, and has led to the appearance of another edition.—*Med. and Surg. Reporter*, Feb. 2, 1878.

Notwithstanding the increase in size, we observe that much old matter has been omitted. The entire work has been thoroughly written up, and not merely amended by a few extra chapters. A great improvement has been made in the illustrations. One hundred and fifty new ones have been added, and many of the old ones have been redrawn. The author highly appreciates the favor with which his work has been received by American surgeons, and has endeavored to render his latest edition more than ever worthy of their approval. That he has succeeded admirably, must, we think, be the general opinion. We heartily recommend the book to both student and practitioner.—*N. Y. Med. Journal*, Feb. 1878.

Erichsen has stood so prominently forward for years as a writer on Surgery, that his reputation is world wide, and his name is as familiar to the medical student as to the accomplished and experienced surgeon. The work is not a reprint of former editions, but has in many places been entirely rewritten. Recent improvements in surgery have not escaped his notice, various new operations have been thoroughly analyzed, and their merits thoroughly discussed. One hundred and fifty new wood-cuts add to the value of this work.—*N. O. Med. and Surg. Journal*, March, 1878.

HOLMES (TIMOTHY), M.D.,

Surgeon to St. George's Hospital, London.

SURGERY, ITS PRINCIPLES AND PRACTICE. In one handsome octavo volume of nearly 1000 pages, with 411 illustrations. Cloth, $6; leather, $7. (*Just Issued*.)

This is a work which has been looked for on both sides of the Atlantic with much interest. Mr. Holmes is a surgeon of large and varied experience, and one of the best known, and perhaps the most brilliant writer upon surgical subjects in England. It is a book for students—and an admirable one—and for the busy general practitioner. It will give a student all the knowledge needed to pass a rigid examination. The book fairly justifies the high expectations that were formed of it. Its style is clear and forcible, even brilliant at times, and the conciseness needed to bring it within its proper limits has not impaired its force and distinctness.—*N. Y. Med. Record*, April 14, 1876.

It will be found a most excellent epitome of surgery by the general practitioner who has not the time to give attention to more minute and extended works and to the medical student. In fact, we know of no one we can more cordially recommend. The author has succeeded well in giving a plain and practical account of each surgical injury and disease, and of the treatment which is most commonly advisable. It will no doubt become a popular work in the profession, and especially as a text-book.—*Cincinnati Med. News*, April, 1876.

ASHTON ON THE DISEASES, INJURIES, AND MALFORMATIONS OF THE RECTUM AND ANUS: with remarks on Habitual Constipation. Second American, from the fourth and enlarged London Edition. With illustrations. In one 8vo. vol. of 287 pages, cloth, $3 25.

SARGENT ON BANDAGING AND OTHER OPERATIONS OF MINOR SURGERY. New edition, with an additional chapter on Military Surgery. One 12mo. vol. of 353 pages with 184 wood-cuts. Cloth, $1 75.

HAMILTON (FRANK H.), M.D.,
Professor of Fractures and Dislocations, &c., in Bellevue Hosp. Med. College, New York.

A PRACTICAL TREATISE ON FRACTURES AND DISLOCATIONS. Fifth edition, revised and improved. In one large and handsome octavo volume of nearly 800 pages, with 344 illustrations. Cloth, $5 75; leather, $6 75. (*Lately Issued.*)

This work is well known, abroad as well as at home, as the highest authority on its important subject—an authority recognized in the courts as well as in the schools and in practice—and again manifested, not only by the demand for a fifth edition, but by arrangements now in progress for the speedy appearance of a translation in Germany. The repeated revisions which the author has thus had the opportunity of making have enabled him to give the most careful consideration to every portion of the volume, and he has sedulously endeavored in the present issue, to perfect the work by the aid of his own enlarged experience, and to incorporate in it whatever of value has been added in this department since the issue of the fourth edition. It will therefore be found considerably improved in matter, while the most careful attention has been paid to the typographical execution, and the volume is presented to the profession in the confident hope that it will more than maintain its very distinguished reputation.

There is no better work on the subject in existence than that of Dr. Hamilton. It should be in the possession of every general practitioner and surgeon.—*The Am. Journ. of Obstetrics*, Feb. 1876.

The value of a work like this to the practical physician and surgeon can hardly be over-estimated, and the necessity of having such a book revised to the latest dates, not merely on account of the practical importance of its teachings, but also by reason of the medico-legal bearings of the cases of which it treats, and which have recently been the subject of useful papers by Dr. Hamilton and others, is sufficiently obvious to every one. The present volume seems to amply fill all the requisites. We can safely recommend it as the best of its kind in the English language, and not excelled in any other. *Journ. of Nervous and Mental Disease*, Jan. 1876.

BROWNE (EDGAR A.),
Surgeon to the Liverpool Eye and Ear Infirmary, and to the Dispensary for Skin Diseases.

HOW TO USE THE OPHTHALMOSCOPE. Being Elementary Instructions in Ophthalmoscopy, arranged for the Use of Students. With thirty-five illustrations. In one small volume royal 12mo. of 120 pages: cloth, $1. (*Now Ready.*)

CARTER (R. BRUDENELL), F.R.C.S.,
Ophthalmic Surgeon to St. George's Hospital, etc.

A PRACTICAL TREATISE ON DISEASES OF THE EYE. Edited, with test-types and Additions, by JOHN GREEN, M.D. (of St. Louis, Mo.). In one handsome octavo volume of about 500 pages, and 124 illustrations. Cloth, $3 75. (*Just Issued.*)

It would be difficult for Mr. Carter to write an uninstructive book, and impossible for him to write an uninteresting one. Even on subjects with which he is not bound to be familiar, he can discourse with a rare degree of clearness and effect. Our readers will therefore not be surprised to learn that a work by him on the Diseases of the Eye makes a very valuable addition to ophthalmic literature. . . . The book will remain one useful alike to the general and the special practitioner.—*London Lancet*, Oct. 30, 1875.

It is with great pleasure that we can endorse the work as a most valuable contribution to practical ophthalmology. Mr. Carter never deviates from the end he has in view, and presents the subject in a clear and concise manner, easy of comprehension, and hence the more valuable. We would especially commend, however, as worthy of high praise, the manner in which the therapeutics of disease of the eye is elaborated, for here the author is particularly clear and practical, where other writers are unfortunately too often deficient. The final chapter is devoted to a discussion of the uses and selection of spectacles, and is admirably compact, plain, and useful, especially the paragraphs on the treatment of presbyopia and myopia. In conclusion, our thanks are due the author for many useful hints in the great subject of ophthalmic surgery and therapeutics, a field where of late years we glean but a few grains of sound wheat from a mass of chaff.—*New York Medical Record*, Oct. 23, 1875.

WELLS (J. SOELBERG),
Professor of Ophthalmology in King's College Hospital, &c.

A TREATISE ON DISEASES OF THE EYE. Third American, from the Fourth and Revised London Edition, with additions; illustrated with numerous engravings on wood, and six colored plates. Together with selections from the Test-types of Jaeger and Snellen. In one large and very handsome octavo volume. (*Preparing.*)

NETTLESHIP (EDWARD), F.R.C.S.,
Ophthalmic Surg. and Lect. on Ophth. Surg. at St. Thomas' Hospital, London.

MANUAL OF OPHTHALMIC MEDICINE. In one royal 12mo. volume of about 350 pages. (*Shortly.*)

LAURENCE (JOHN Z.), F.R.C.S.,
Editor of the Ophthalmic Review, &c.

A HANDY-BOOK OF OPHTHALMIC SURGERY, for the use of Practitioners. Second Edition, revised and enlarged. With numerous illustrations. In one very handsome octavo volume, cloth, $2 75.

LAWSON (GEORGE), F.R.C.S. Engl.,
Assistant Surgeon to the Royal London Ophthalmic Hospital, Moorfields, &c.

INJURIES OF THE EYE, ORBIT, AND EYELIDS: their Immediate and Remote Effects. With about one hundred illustrations. In one very handsome octavo volume, cloth, $3 50.

BURNETT (CHARLES H.), M.A., M.D.,

Aural Surg. to the Presb. Hosp., Surgeon-in-charge of the Infir. for Dis. of the Ear, Phila.

THE EAR, ITS ANATOMY, PHYSIOLOGY, AND DISEASES.

A Practical Treatise for the Use of Medical Students and Practitioners. In one handsome octavo volume of 615 pages, with eighty-seven illustrations: cloth, $4 50; leather, $5 50. (*Just Ready.*)

Recent progress in the investigation of the structures of the ear, and advances made in the modes of treating its diseases, would seem to render desirable a new work in which all the resources of the most advanced science should be placed at the disposal of the practitioner. This it has been the aim of Dr. Burnett to accomplish, and the advantages which he has enjoyed in the special study of the subject are a guarantee that the result of his labors will prove of service to the profession at large, as well as to the specialist in this department.

Foremost among the numerous recent contributions to aural literature will be ranked this work of Dr. Burnett. It is impossible to do justice to this volume of over 600 pages in a necessarily brief notice. It must suffice to add that the book is profusely and accurately illustrated, the references are conscientiously acknowledged, while the result has been to produce a treatise which will henceforth rank with the classic writings of Wilde and Von Tröltsch.—*The Lond. Practitioner*, May, 1879.

On account of the great advances which have been made of late years in otology, and of the increased interest manifested in it, the medical profession will welcome this new work, which presents clearly and concisely its present aspect, whilst clearly indicating the direction in which further researches can be most profitably carried on. Dr. Burnett from his own matured experience, and availing himself of the observations and discoveries of others, has produced a work, which as a text-book, stands *facile princeps* in our language. We had marked several passages as well worthy of quotation and the attention of the general practitioner, but their number and the space at our command forbid. Perhaps it is better, as the book ought to be in the hands of every medical student, and its study will well repay the busy practitioner in the pleasure he will derive from the agreeable style in which many otherwise dry and mostly unknown subjects are treated. To the specialist the work is of the highest value, and his sense of gratitude to Dr. Burnett will, we hope, be proportionate to the amount of benefit he can obtain from the careful study of the book, and a constant reference to its trustworthy pages.—*Edinb. Med. Jour.*, Aug. 1878.

The book is designed especially for the use of students and general practitioners, and places at their disposal much valuable material. Such a book as the present one, we think, has long been needed, and we may congratulate the author on his success in filling the gap. Both student and practitioner can study the work with a great deal of benefit. It is profusely and beautifully illustrated.—*N. Y. Hospital Gazette*, Oct. 15, 1877.

Dr. Burnett is to be commended for having written the best book on the subject in the English language, and especially for the care and attention he has given to the scientific side of the subject.—*N. Y. Med. Journ.*, Dec. 1877.

TAYLOR (ALFRED S.), M.D.,

Lecturer on Med. Jurisp. and Chemistry in Guy's Hospital.

POISONS IN RELATION TO MEDICAL JURISPRUDENCE AND MEDICINE.

Third American, from the Third and Revised English Edition. In one large octavo volume of 850 pages; cloth, $5 50; leather, $6 50. (*Just Issued.*)

The present is based upon the two previous editions; "but the complete revision rendered necessary by time has converted it into a new work." This statement from the preface contains all that it is desired to know in reference to the new edition. The works of this author are already in the library of every physician who is liable to be called upon for medico-legal testimony (and what one is not?), so that all that is required to be known about the present book is that the author has kept it abreast with the times. What makes it now, as always, especially valuable to the practitioner is its conciseness and practical character, only those poisonous substances being described which give rise to legal investigations.—*The Clinic*, Nov. 6, 1875.

Dr. Taylor has brought to bear on the compilation of this volume, stores of learning, experience, and practical acquaintance with his subject, probably far beyond what any other living authority on toxicology could have amassed or utilized. He has fully sustained his reputation by the consummate skill and legal acumen he has displayed in the arrangement of the subject-matter, and the result is a work on Poisons which will be indispensable to every student or practitioner in law and medicine.—*The Dublin Journ. of Med. Sci.*, Oct. 1875.

BY THE SAME AUTHOR.

MEDICAL JURISPRUDENCE.

Seventh American Edition. Edited by JOHN J. REESE, M.D., Prof. of Med. Jurisp. in the Univ. of Penn. In one large octavo volume of nearly 900 pages. Cloth, $5 00; leather, $6 00. (*Lately Issued.*)

To the members of the legal and medical profession, it is unnecessary to say anything commendatory of Taylor's Medical Jurisprudence. We might as well undertake to speak of the merit of Chitty's Pleadings.—*Chicago Legal News*, Oct. 16, 1873.

It is beyond question the most attractive as well as most reliable manual of medical jurisprudence published in the English language.—*Am. Journal of Syphilography*, Oct. 1873.

It is altogether superfluous for us to offer anything in behalf of a work on medical jurisprudence by an author who is almost universally esteemed to be the best authority on this specialty in our language. On this point, however, we will say that we consider Dr. Taylor to be the safest medico-legal authority to follow, in general, with which we are acquainted in any language.—*Va. Clin. Record*, Nov. 1873.

This last edition of the Manual is probably the best of all, as it contains more material and is worked up to the latest views of the author as expressed in the last edition of the Principles. Dr. Reese, the editor of the Manual, has done everything to make his work acceptable to his medical countrymen.—*N. Y. Med. Record*, Jan. 15, 1874.

BY THE SAME AUTHOR.

THE PRINCIPLES AND PRACTICE OF MEDICAL JURISPRUDENCE.

Second Edition, Revised, with numerous Illustrations. In two large octavo volumes, cloth, $10 00; leather, $12 00.

This great work is now recognized in England as the fullest and most authoritative treatise on every department of its important subject. In laying it, in its improved form, before the American profession, the publisher trusts that it will assume the same position in this country.

THOMPSON (SIR HENRY),

Surgeon and Professor of Clinical Surgery to University College Hospital.

LECTURES ON DISEASES OF THE URINARY ORGANS. With illustrations on wood. Second American from the Third English Edition. In one neat octavo volume. Cloth, $2 25. (*Just Issued.*)

BY THE SAME AUTHOR.

ON THE PATHOLOGY AND TREATMENT OF STRICTURE OF THE URETHRA AND URINARY FISTULÆ. With plates and wood-cuts. From the third and revised English edition. In one very handsome octavo volume, cloth, $3 50. (*Lately Published.*)

ROBERTS (WILLIAM), M.D.,

Lecturer on Medicine in the Manchester School of Medicine, etc.

A PRACTICAL TREATISE ON URINARY AND RENAL DISEASES, including Urinary Deposits. Illustrated by numerous cases and engravings. Second American, from the Second Revised and Enlarged London Edition. In one large and handsome octavo volume of 616 pages, with a colored plate; cloth, $4 50. (*Lately Published.*)

TUKE (DANIEL HACK), M.D.,

Joint author of "The Manual of Psychological Medicine," &c.

ILLUSTRATIONS OF THE INFLUENCE OF THE MIND UPON THE BODY IN HEALTH AND DISEASE. Designed to illustrate the Action of the Imagination. In one handsome octavo volume of 416 pages, cloth, $3 25. (*Lately Issued.*)

BLANDFORD (G. FIELDING), M.D., F.R.C.P.,

Lecturer on Psychological Medicine at the School of St. George's Hospital, &c.

INSANITY AND ITS TREATMENT: Lectures on the Treatment, Medical and Legal, of Insane Patients. With a Summary of the Laws in force in the United States on the Confinement of the Insane. By ISAAC RAY, M. D. In one very handsome octavo volume of 471 pages; cloth, $3 25.

It satisfies a want which must have been sorely felt by the busy general practitioners of this country. It takes the form of a manual of clinical description of the various forms of insanity, with a description of the mode of examining persons suspected of insanity. We call particular attention to this feature of the book, as giving it a unique value to the general practitioner. If we pass from theoretical considerations to descriptions of the varieties of insanity as actually seen in practice and the appropriate treatment for them, we find in Dr. Blandford's work a considerable advance over previous writings on the subject. His pictures of the various forms of mental disease are so clear and good that no reader can fail to be struck with their superiority to those given in ordinary manuals in the English language or (so far as our own reading extends) in any other.—*London Practitioner*, Feb. 1871.

LEA (HENRY C.).

SUPERSTITION AND FORCE: ESSAYS ON THE WAGER OF LAW, THE WAGER OF BATTLE, THE ORDEAL, AND TORTURE. Third Revised and Enlarged Edition. In one handsome royal 12mo. volume of 552 pages. Cloth, $2 50. (*Just Ready.*)

The appearance of a new edition of Mr. Henry C. Lea's "Superstition and Force" is a sign that our highest scholarship is not without honor in its native country. Mr. Lea has met every fresh demand for his work with a careful revision of it, and the present edition is not only fuller and, if possible, more accurate than either of the preceding, but, from the thorough elaboration is more like a harmonious concert and less like a batch of studies.—*The Nation*, Aug. 1, 1878.

Many will be tempted to say that this, like the "Decline and Fall," is one of the uncriticizable books. Its facts are innumerable, its deductions simple and inevitable, and its *chevaux-de-frise* of references bristling and dense enough to make the keenest, stoutest, and best equipped assailant think twice before advancing. Nor is there anything controversial in it to provoke assault. The author is no polemic. Though he obviously feels and thinks strongly, he succeeds in attaining impartiality. Whether looked on as a picture or a mirror, a work such as this has a lasting value.—*Lippincott's Magazine*, Oct. 1878.

Mr. Lea's curious historical monographs, of which one of the most important is here reproduced in an enlarged form, have given him an unique position among English and American scholars. He is distinguished for his recondite and affluent learning, his power of exhaustive historical analysis, the breadth and accuracy of his researches among the rarer sources of knowledge, the gravity and temperance of his statements, combined with singular earnestness of conviction, and his warm attachment to the cause of human freedom and intellectual progress.—*N. Y. Tribune*, Aug. 9, 1878.

BY THE SAME AUTHOR. (*Lately Published.*)

STUDIES IN CHURCH HISTORY—THE RISE OF THE TEMPORAL POWER—BENEFIT OF CLERGY—EXCOMMUNICATION. In one large royal 12mo. volume of 516 pp.; cloth, $2 75.

The story was never told more calmly or with greater learning or wiser thought. We doubt, indeed, if any other study of this field can be compared with this for clearness, accuracy, and power.—*Chicago Examiner*, Dec. 1870.

Mr. Lea's latest work, "Studies in Church History," fully sustains the promise of the first. It deals with three subjects—the Temporal Power, Benefit of Clergy, and Excommunication, the record of which has a peculiar importance for the English student, and is a chapter on Ancient Law likely to be regarded as final. We can hardly pass from our mention of such works as these—with which that on "Sacerdotal Celibacy" should be included—without noting the literary phenomenon that the head of one of the first American houses is also the writer of some of its most original books.—*London Athenæum*, Jan. 7 1871.

INDEX TO CATALOGUE.

	PAGE
American Journal of the Medical Sciences	1
Abstract, Monthly, of the Med. Sciences	3
Allen's Anatomy	7
Anatomical Atlas, by Smith and Horner	7
Ashton on the Rectum and Anus	28
Attfield's Chemistry	10
Ashwell on Diseases of Females	23
Ashhurst's Surgery	25
Browne on Ophthalmoscope	29
Browne on the Throat	19
Burnett on the Ear	30
Barnes on Diseases of Women	22
Barnes' Midwifery	24
Bellamy's Surgical Anatomy	7
Bryant's Practical Surgery	27
Bloxam's Chemistry	11
Blandford on Insanity	31
Basham on Renal Diseases	19
Brinton on the Stomach	19
Barlow's Practice of Medicine	14
Bowman's (John E.) Practical Chemistry	9
Bowman's (John E.) Medical Chemistry	9
Bristowe's Practice	16
Bumstead on Venereal	20
Bumstead and Cullerier's Atlas of Venereal	20
Carpenter's Human Physiology	8
Carpenter on the Use and Abuse of Alcohol	13
Cornil and Ranvier	14
Carter on the Eye	29
Cleland's Dissector	7
Classen's Chemistry	9
Clowes' Chemistry	11
Century of American Medicine	5
Chadwick on Diseases of Women	23
Charcot on the Nervous System	18
Chambers on Diet and Regimen	18
Christison and Griffith's Dispensatory	14
Churchill's System of Midwifery	21
Churchill on Puerperal Fever	21
Condie on Diseases of Children	20
Cooper's (B. B.) Lectures on Surgery	25
Cullerier's Atlas of Venereal Diseases	19
Cyclopædia of Practical Medicine	14
Dalton's Human Physiology	9
Davis's Clinical Lectures	14
Dewees on Diseases of Females	21
Druitt's Modern Surgery	26
Dunglison's Medical Dictionary	4
Ellis's Demonstrations in Anatomy	7
Erichsen's System of Surgery	28
Emmet on Diseases of Women	23
Farquharson's Therapeutics	12
Fenwick's Diagnosis	14
Finlayson's Clinical Diagnosis	18
Flint on Respiratory Organs	19
Flint on the Heart	19
Flint's Practice of Medicine	15
Flint's Essays	15
Flint's Clinical Medicine	15
Flint on Phthisis	19
Flint on Percussion	19
Fothergill's Handbook of Treatment	16
Fothergill's Antagonism of Therapeutic Agents	16
Fownes's Elementary Chemistry	10
Fox on Diseases of the Skin	17
Fuller on the Lungs, &c.	19
Green's Pathology and Morbid Anatomy	14
Gibson's Surgery	25
Gluge's Pathological Histology, by Leidy	14
Gray's Anatomy	6
Galloway's Analysis	9
Griffith's (R. E.) Universal Formulary	12
Gross on Urinary Organs	26
Gross on Foreign Bodies in Air-Passages	26
Gross's Principles and Practice of Surgery	26
Habershon on the Abdomen	16
Hamilton on Dislocations and Fractures	29
Hartshorne's Essentials of Medicine	15
Hartshorne's Conspectus of the Medical Sciences	5
Hartshorne's Anatomy and Physiology	8
Hamilton on Nervous Diseases	18
Heath's Practical Anatomy	6
Hoblyn's Medical Dictionary	4
Hodge on Women	21
Hodge's Obstetrics	25
Holland's Medical Notes and Reflections	14
Holmes's Surgery	28
Holden's Landmarks	6
Horner's Anatomy and Histology	7
Hudson on Fever	19
Hill on Venereal Diseases	20
Hillier's Handbook of Skin Diseases	17
Jones (C. Handfield) on Nervous Disorders	18
Kirkes' Physiology	8
Knapp's Chemical Technology	11
Lea's Superstition and Force	31
Lea's Studies in Church History	31
Lee on Syphilis	20
Lincoln on Electro-Therapeutics	18
Leishman's Midwifery	25
La Roche on Yellow Fever	14
La Roche on Pneumonia, &c.	19
Laurence and Moon's Ophthalmic Surgery	29
Lawson on the Eye	29
Lehmann's Physiological Chemistry, 2 vols.	8
Lehmann's Chemical Physiology	8
Ludlow's Manual of Examinations	5
Lyons on Fever	19
Medical News and Library	2
Meigs on Puerperal Fever	22
Miller's Practice of Surgery	25
Miller's Principles of Surgery	25
Montgomery on Pregnancy	21
Nettleship's Ophthalmic Medicine	29
Neill and Smith's Compendium of Med. Science	5
Obstetrical Journal	24
Parry on Extra-Uterine Pregnancy	25
Pavy on Digestion	18
Pavy on Food	18
Parrish's Practical Pharmacy	11
Pirrie's System of Surgery	25
Playfair's Midwifery	24
Quain and Sharpey's Anatomy, by Leidy	7
Reynolds' Practice of Medicine	17
Roberts on Urinary Diseases	31
Ramsbotham on Parturition	23
Remsen's Principles of Chemistry	9
Rigby's Midwifery	21
Rodwell's Dictionary of Science	5
Stimson's Operative Surgery	25
Swayne's Obstetric Aphorisms	21
Seiler on the Throat	19
Sargent's Minor Surgery	28
Sharpey and Quain's Anatomy, by Leidy	7
Skey's Operative Surgery	25
Slade on Diphtheria	19
Schäfer's Histology	7
Smith (J. L.) on Children	21
Smith (H. H.) and Horner's Anatomical Atlas	7
Smith (Edward) on Consumption	19
Smith on Wasting Diseases in Children	20
Stillé's Therapeutics	12
Stillé & Maisch's Dispensatory	13
Sturges on Clinical Medicine	14
Stokes on Fever	14
Tanner's Manual of Clinical Medicine	5
Tanner on Pregnancy	23
Taylor's Medical Jurisprudence	30
Taylor's Principles and Practice of Med. Jurisp.	30
Taylor on Poisons	30
Tuke on the Influence of the Mind	31
Thomas on Diseases of Females	22
Thompson on Urinary Organs	31
Thompson on Stricture	31
Todd on Acute Diseases	14
Woodbury's Practice	16
Walshe on the Heart	19
Watson's Practice of Physic	15
Wells on the Eye	29
West on Diseases of Females	20
West on Diseases of Children	20
West on Nervous Disorders of Children	21
What to Observe in Medical Cases	14
Williams on Consumption	19
Wilson's Human Anatomy	7
Wilson's Handbook of Cutaneous Medicine	17
Wöhler's Organic Chemistry	9
Winckel on Childbed	23

L61 Flint, Austin. 12643
F62 Clinical medicine
1879

NAME DATE DUE